Part II Attachments and Goals

This is a draft (February 11, 2002) of Part II of *The Emotion Machine* by Marvin Minsky. Please do not distribute this version because it will change. All comments welcome: send them to minsky@media.mit.edu.

§ 2-1. **Playing with Mud**

> "*It's not just learning things that's important. It's learning what to do with what you learn and learning why you learn things at all that matters*." –Norton Juster [in *The Phantom Tollbooth]*

Let's imagine a child named Carol. Carol has wandered away from her mother. Equipped with a fork, a spoon, and a cup, she has found a place that has plenty of mud. Her make-believe goal is to make a cake, the way she's seen her mother do. Here are three versions of what might take place.

> *Playing Alone. She wants to fill her cup with mud, and first tries to do this with her fork, but this fails because the mud slips through. She feels frustrated and disappointed. But when she succeeds by using the spoon, Carol feels satisfied and pleased.*

What might Carol learn from this? She learns from her failure with using a fork, that forks are not good for carrying mud. But she learns from her success with a spoon, that a spoon can be good for moving a fluid. From failures we learn which methods don't work–while successes teach us which methods succeed.

Note that Carol did this while working alone–and acquired new knowledge, all by herself. *In the course of learning by trial and error, a person requires no teacher to help her.*

> *A Stranger Scolds. Unexpectedly, a stranger reproaches her: "That's a naughty thing to do." Carol feels anxious, alarmed, and afraid. Overcome by fear and the urge to escape, she puts her present goal on hold–and runs to find her mother.*

What might Carol learn from this? She won't learn much about working with mud–but she will learn that *this* is a dangerous place, which she ought to avoid in the future. Too many disturbing encounters like that could make her become less adventurous.

> *Her Mother's Reproach. Carol returns to her mother's protection–but instead of assurance, her parent rebukes her. "What a disgraceful mess you've made! See what you've done to your clothes and face. I scarcely can bear to look at you!" Carol, ashamed, begins to cry.*

What might Carol learn from this? She'll become less inclined toward playing with mud. If her parent had chosen to praise her instead, she would have felt pride instead of shame–and in future times would be more inclined to further pursue that same kind of play. *In the face of a parent's blame or reproach, she learns that her goal was not good to pursue.*

How many kinds of learning are used, in the thousand minutes of each child's day–and how many emotions do they engage? In this very brief story we've touched upon satisfaction, affection, and pride–passions we think of as positive. We also talked about shame and disgrace–and fear, anxiety, and alarm–all feelings we think of as negative. What functions do all these emotions serve? Why do we have them and how do they work? Why do they seem so to come in pairs, like sorrow and joy, or shame and pride?

In the next few sections we'll focus upon those emotional partners–Pride and Shame. Why do those feelings have special effects on the processes Carol uses to learn? Why do such feelings mainly occur when she's close

to someone to whom she is closely attached? Clearly, attachments help children survive, through nourishment and protection from harm. But shortly we'll see how those same kinds of bonds play other, extremely other important roles: *they help us to learn new kinds of goals!*

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§ 2-2 Attachments and Goals

> *"The most curious instance known to me, of one instinct getting the better of another, is the migratory instinct conquering the maternal instinct. The former is wonderfully strong; a confined bird will at the proper season beat her breast against the wires of her cage, until it is bare and bloody. It causes young salmon to leap out of the fresh water, in which they could continue to exist, and thus unintentionally to commit suicide. Every one knows how strong the maternal instinct is, leading even timid birds to face great danger, though with hesitation, and in opposition to the instinct of self-preservation. Nevertheless, the migratory instinct is so powerful, that late in the autumn swallows, house-martins, and swifts frequently desert their tender young, leaving them to perish miserably in their nests."* –Charles Darwin, in *The Descent of Man*.

Some of the strongest emotions we know are the feelings that we experience in the presence of persons to whom we're attached. When we're praised or rebuked by the people we love, we don't just feel pleased or dissatisfied; instead, we tend to feel proud or ashamed. We sometimes call these the 'self-conscious' emotions, because they seem to be involved with our concerns about ourselves. But why should such feelings depend on attachments? Because, I suspect, they have special connections to certain peculiar ways that we learn. The next few sections propose some new theories about what we'll call "attachment-based learning."

One way that we differ from animals is in how helpless our infants are, through their greatly extended infancies. One popular view is that this evolved for mechanical reasons: so that we could give birth to smaller brains. But another cause could be that we had to equip those more versatile brains to work in more complex communities. Our children now had to acquire more knowledge than could ever be learned by trial and error–so we had to evolve ways to 'download' more wisdom from other people. To promote this, our infants became afflicted with serious "disabilities," which suppressed many of the survival skills that most other mammals show soon after birth. Now we depended yet more on their parents–and acquired more intense concerns about how our parents reacted to us–and vice versa. Let's reconsider what Carol has learned, in the context of persons to whom she's attached.

> *In the scene in which Carol was playing alone, when using a fork failed to fill her cup, her disappointment helped her learn not to use that method again. But when she felt pleased by success with a spoon, her satisfaction helped her learn that this was a better method to use–so that next time she wants to fill a cup, she'll know more about how to do it.*

Note that our child learned this through trial and error, without any need for a teacher to help her.

> *In the scene in which a stranger appeared, Carol felt a sense of fear. This led her to look for a way to escape and to seek her parent's protection. This probably had no effect on her goal of learning how to put mud in a cup–but it taught her to dread that particular place.*

Next time she'll play in some safer location.

> *In the scene where Carol's mother reproached her, the child experienced different emotions–the kinds*

that we call Pride and Shame. This led to learning something else; she altered her goals, instead of her methods!

Why did Carol to learn in so different a way–when being censured by her mother? T hat judgment makes the child feels shame: "*I should not have had that disgraceful goal.*" But when her mother praises her, she feels that her goal was respectable. It is one thing to learn how to *get* what you want–and another, to learn what you *ought* to want. In practical learning by trial and error, you improve your skills for doing things that you already wish to do. But when your self-conscious emotions are aroused–by the manner of persons to whom you're attached–you're likely to alter your future goals.

Trial and error can teach us techniques for achieving the goals we already maintain.
But attachment-related blame and praise teach us which goals to discard or retain.

Pride and Shame clearly have special effects; they make us learn 'ends' instead of 'means'. Listen to how Michael Lewis describes some of the common effects of shame:

> *Shame results when an individual judges his or her actions as a failure in regard to his or her standards, rules and goals and then makes a global attribution. The person experiencing shame wishes to hide, disappear or die. It is a highly negative and painful state that also disrupts ongoing behavior and causes confusion in thought and an inability to speak. The body of the shamed person seems to shrink, as if to disappear from the eye of the self or others. Because of the intensity of this emotional state, and the global attack on the self-system, all that individuals can do when presented with such a state is to attempt to rid themselves of it.* – [Michael Lewis, "Self-conscious Emotions," American Scientist vol. 83, Jan 1995.]

Why do we have these special emotions? Our next few sections will argue that shame and pride have special effects on how we acquire our personal values. It has long been held by our popular culture that children 'build their characters' in their early, so-called 'formative years'–and that this is influenced by our parents–or by others to whom we've become 'attached'. However, our present-day concepts of how this works appear to have some curious gaps; they either almost completely neglect (or else suggest wrong answers to) many critical questions like these:

To whom do our children become attached?
How does attachment help establish our values?
What is the span of those 'formative' years?

When, if ever, do we outgrow them?

In the following section we'll suggest that when children are close to whom they are attached, those children won't learn in the usual way, but in a dramatically different manner.

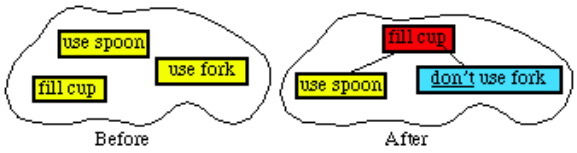
Student: What do you mean by "the usual way?"

I mean by learning by what we call 'trial and error'–the way Carol learned when playing alone, when she worked by herself to fill her cup. She was annoyed when she failed with a fork, but was pleased by success when she used a spoon–so the next time she wants to fill a cup, she'll be more likely to know what to do. Can you tell me a theory of how that might work?

Student: I suppose that her brain formed some kind of connection between her goal and the way she achieved it.

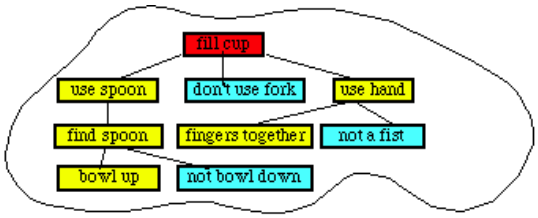
OK, but that is rather vague. Could you say more about how that actually works?

Student: No, because we don't yet know the details of how our brains represent goals. However, the Goal-Cloud Model suggests an image of Carol's mind as a sort of cloud where methods and goals are floating around. So when she succeeds by using her spoon, she connects "Fill Cup" down to "Use Spoon."



"Then the next time Carol wants to fill the cup, she'll first try the sub-goal of using a spoon. In a similar way, when she fails with the fork, she makes a "don't" connection down to "Use Fork," to keep from doing that again."

Excellent. I especially like your "don't do" connection, because an expert also has to learn how to avoid the most common mistakes. (We'll return to that in §Negative Expertise}) So if Carol keeps connecting goals to sub-goals, she'll build great branching trees of connections. I suspect that a typical person's brain contains several tens of millions of items like these. In {Commonsense Knowledge} we'll speculate about how all that knowledge gets organized.



There still remains an important question. The scheme just described attaches new subgoals to goals that already exist in your goal-cloud. This suggests how people could learn new ways to learn, by using "trial and error," to achieve the goals they already have–by attaching effective subgoals to them. But how could a person learn wholly new goals–and what could (or should) they connect them to? How can you learn what you "ought" to want–that is, how does a person learn 'values'? How could Carol acquire new goals that go 'above' those she already knows?

Student: *Umm. I don't think I've ever seen this discussed in any of my psychology books. OK, I give up. What's your answer?*

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§ 2-3 Imprimers

"Now since shame is a mental picture of disgrace, in which we shrink from the disgrace itself and not from its consequences, and we only care what opinion is held of us because of the people who form that opinion, it follows that the people before whom we feel shame are those whose opinion of us matters to us. Such persons are: those who admire us, those whom we admire, those by whom we wish to be admired, those with whom we are competing, and those opinion of us we respect." Aristotle (Rhetoric

2, 6.)

Our language must have a thousand words for describing our emotional states. In the scene where Carol was playing with mud, we had to use more than a dozen of them–*affection, alarm, anxiety, assurance, disappointment, disgrace, disturbance, frustration, fear, inclination, pleasure, pride, satisfaction, shame,* and *sorrow*.

Why do we have those states at all–and why do we have so many of them? Why does Carol feel grateful and proud when she receives praise from her mother? And why does this, somehow, 'elevate' goals to make them seem more 'respectable'?

> *Student: You've already answered part of that. She must have some kind of "attachment bond"–which makes her react in that special way–just as Aristotle said–because of concern for her mother's regard for her. You also said that we elevate goals when we're praised by a person to whom we're 'attached'. But you never explained why praise alone is not enough to elevate goals. Why should we also require that extra role of–umm, what is the proper word for this–of "the presence of someone to whom we're attached?*

Psychologists often use 'caregiver' for "a person to whom a child is attached." They cannot say 'parent', or 'mother' or 'father' because someone else might play that role–like a grandparent, nurse, or family friend. But 'caregiver' is not the proper word because, as we'll see in {Infant Attachment}, such attachments can form without physical care. So here I'll introduce two new words–both derived from the term 'imprinting'–the name that psychologists have used for the processes that tend to keep some young animals close to their parents. I should warn readers that the theory I describe in this book, about how human attachment-based learning might work, is new and is not an established one in Psychology.

> **Imprimer**: *A child's Imprimer is one of those persons to whom that child is attached.*
> **Impriming**: *A special way to learn new goals that works when a child's Imprimer is present.*

I should note that "Impriming" resembles the 'reinforcement' of traditional psychology, but is different enough to deserve a new word. It is remarkable that our language has no special word for this most influential relationship! We don't know how praise arouses Impriming or why this won't happen when praise comes from strangers. However, it is easy to see why this might have evolved. For, consider what might happen if any stranger could imprime a child. *Then anyone could have programmed you to do anything they want you to do–just by changing what you, yourself, want to do!* So we must have evolved some special constraints on who could become our Imprimers.

> *Student: I like your idea that Attachment is used to induce our children to adopt our goals (though perhaps you've merely made me agree by exploiting your role as Imprimer). But is there any evidence that this mechanism really exists?*

As we'll shortly see in {Infant Attachment} there certainly is evidence that a child's development can be impaired by failure to make good attachments. However, I do not know of any search for brain activities that are clearly connected with the presence of a person's Imprimers. Future advances in ways to scan brains should be able to show if some special machinery is involved with this. Then we could try to distinguish between activities that establish new, high level goals versus those that connect these to sub-goals. [In the meantime, we could try to make models by writing programs that embody these theories–and, when these don't work, we'll improve the theories.

> *Student: I suppose that would show us more about how Attachment-based Learning works. But still we'd need some way to explain the strong feelings that come with Pride and Shame.*

In the next few sections we'll start to explain what kinds of processes feelings are. I'll argue that a process leads to a 'feeling' when other 'reflective' processes react to it by making descriptions of its effects. Then yet other processes react to these, by describing how those descriptions are used–and so on. This sort of 'cascade' or 'chain reaction' sometimes leads to increasingly larger and larger cascades–and these are what we like to describe as especially powerful feelings.

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§ 2-4 The Attachment Elevator Hypothesis

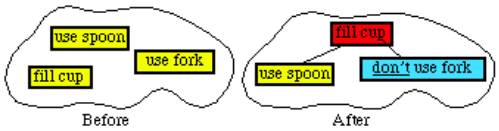
> *"Each of us has beliefs about what constitutes acceptable actions, thoughts and feelings. We acquire our standards, rules and goals through acculturation . . . and each of us has acquired a set appropriate to our particular circumstances. To become a member of any group, we are required to learn them. Living up to one's own internalized set of standards–or failing to live up to them–forms the basis of some very complex emotions." – Michael Lewis, in [Shame, The Exposed Self, 1991, Free Press, New York.]*

When we're close to the persons to whom we're attached–the ones that we'll call our 'Imprimers'–we find ourselves thinking in special ways. Carol's concern with her cupful of mud may have started out as a casual urge to play with materials near at hand–as just an engaging activity. But when she is praised by someone she loves, she feels a special thrill of pride that elevates her present goal to a higher kind of priority. In future times, she'll find that this activity now seems much more "respectable." Conversely, when loved ones censure you, this makes you feel that your present goal is undignified and unworthy of you. What makes Carol feel so proud when her parents applaud her accomplishments? Why should their censure affect her so much that a single gesture can change her forever? Even when her Imprimers are far from the scene, she still may wonder about how they might feel: Would they approve of what I am doing? Would they approve of what I am *thinking*? What kinds of machinery might we engage that makes us entertain such concerns? As Michael Lewis goes on to remark,

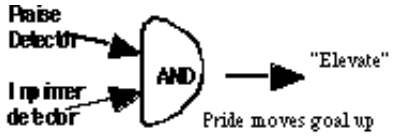
> *"The so-called self-conscious emotions, such as guilt, pride, shame and hubris, require a fairly sophisticated level of intellectual development. To feel them, individuals must have a sense of self as well as a set of standards. They must also have notions of what constitutes success or failure, and the capacity to evaluate their own behavior."*

The growth of these personal standards and values begins before the third year of life. It is easy to see why such systems evolved; a child who loses her parents' esteem would have less chance to survive. But this doesn't explain how those systems work to build bonds between parent and child. What makes her mother so concerned about Carol's appearance, beliefs, and demeanor? Common sense suggests some obvious answers: Those parents themselves will want to earn the respect of their associates–so they'll want their children to 'behave' in socially acceptable ways; and parents will 'naturally' want their children to learn behaviors that promote their welfare. But common sense tells us nothing about how those processes actually work. So let's construct some theories of how attachment works to 'elevate' goals. In {Consciousness} and in {Self} we'll see more ideas about 'self-respect'–and how brains could represent themselves.

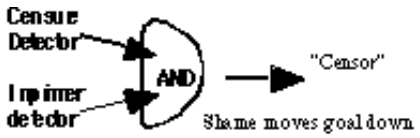
We've already seen how subgoals can be connected to serve our goals–the way that "Use Spoon" was attached to "Fill Cup."



In this image, when a goal gets praised, some machinery raises it up in that cloud, to make it become more ‘respectable’. This could be done by the structure below, where the D-shaped device is an "AND-machine," which requires two inputs before it can act. (In this case, those inputs must be the Imprimer's presence and the Imprimer's expression.) The result is that when the child is praised, this ‘elevates’ the current goal.



Do Praise and Shame work in opposite ways? If approval can make a goal go 'up', then perhaps censure can 'lower' the status of that goal



However, censure also has other effects, which seem to have more in common with Pain. To be sure, both Pain and Shame help us to learn new aversions–but this involves more than the status of goals; in §§3 we’ll see how these can lead to ‘cascades’ that cause our brains to do other things.

> *Student: That may well be, but you still haven’t solved the original problem. You started out by being concerned with how to install new supergoals–because we had nothing to connect them to–and so you introduced your ‘elevator’ idea. Yet we seem still to be in that very same fix, because your model does nothing about this. The new goals are still simply floating around–without any connections to get them aroused? It’s no use to learn a new goal, fact, or skill, if you don't have some way to put it to work.*

We can't give a compact answer to that–because finding good ways to activate goals engages most of the rest of our minds. In {From Time to Time} we'll return to some other questions like these:

> *To what should each new goal be attached–so that it becomes active at suitable times?*
> *How frequently should old goals be aroused, and in which kinds of situations?*
> *What priorities or intensities should they have?*
> *How long should we pursue each goal, before we give up and try something else?*
> *How do we imagine new goals, in the first place?*

Each of these problems might suggest a different elevator-like scheme–and this is why I am not proposing any single particular system. Still, the vague idea of a mental elevator is a useful kind of representation to help us think about mental systems that appear to have multiple structural levels. For example, our brains have many systems that learn–and as these develop over the years, they may tend to form roughly hierarchical structures, because each fragment of newly acquired knowledge is built upon things that we’ve learned before. Therefore we also need various processes to select and control which "levels" we use in those hierarchies. For example, in the course of everyday thinking, one need to constantly control the "level of detail" of descriptions; one must control the efforts one spends in one’s hierarchies of subgoals (so that you won’t waste too much time at subgoals that you can’t achieve). When a plan seems to be working successfully, you’ll want to "descend" to work out details–but when you seem to be getting stuck, you’ll want to ‘look up’ to an overview. Similarly,

we need ways select levels when we're dealing with such issues as the priorities of goals, focus of attention, or representations of time and space.

Student: Why did you insist that those "AND" devices should require both praise and an Imprimer?

We would be in great danger if praise, alone, could cause our brains to elevate goals! For then, as we pointed out earlier, perfect strangers could program you by suggesting new goals and then praising you.

Student: Yes–but to some extent that's already true. I'm not immune to compliments–even from persons I don't respect. But why do you need this theory at all. The only thing you need to assume is that Carol already has the goal of wanting her mother's approval. Then if playing-with-mud leads to that result, then it will simply become a subgoal–of wanting to get that approval. Then it will be just another case of learning by trial and error.

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§ 2-5 Learning and Remembering

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We saw three types of learning in the story of Carol's playing with mud:

Aversion Learning: When a stranger arrives, and scolds the child, the child learns to avoid such situations.

Attachment Learning: When the mother arrives, and scolds the child, the child devalues her current goal.

Subgoal ('reinforcement') Learning: When she succeed by using a spoon, the child learns that this is a useful subgoal.

Indeed, *learning* is a suitcase word, and I suspect that each of us acquires perhaps a dozen other ways to learn.

Carol tried several experiments before she filled her pail by using her spoon. When she recognized that her goal was achieved, she felt satisfaction, fulfillment and pleasure–and those feelings then helped her to learn and remember. But consider how many steps were involved:

Carol filled the pail with her spoon.
She recognized that her goal was achieved.
Then she felt pleased with her success.
That pleasure made her feel satisfied.

All this somehow enabled Carol to learn.

Programmer: I'm delighted that Carol felt gratified–but I don't quite see how this helped her to learn. What functions did all those feelings serve? And, why should that process take so many steps? When we write computer programs that learn, none of those programs need any such feelings. What functions do those chains of events serve, which seem to use pleasure to help us remember? Why can't that connection be more direct? Why couldn't Carol just simply remember which methods worked and which ones failed?

The answer is that ‘remembering’ is not simple at all. On the surface, it might seem easy enough–like dropping a note into a box, and then taking it out when you need it. But when we look more closely at this, we see that the process is rather complex. You first must select what to write in that note, and then you must give it some sort of address, so that after you store its parts away, you’ll be able to re-member it.

> Critic: Some say that our brains record everything–and that if you can’t retrieve a memory, hypnosis or some such technique may be able to help you retrieve it.

This is an old and persistent myth, but experiments have not confirmed it. See {Eidetic Memory}. All evidence appears to suggest that our memories are quite limited–and do not keep extensive records of things that we have not attended to. So Carol’s mind must have ways to decide "which methods worked and which ones failed." But how did she know what actually worked? While Carol was working with that cup, she also did many other things. Perhaps she smiled while using that fork, but happened to frown when using that spoon. What would keep Carol from learning that "to fill a pail, it helps to frown?" Which aspects of what she happened to do should take credit for her final success?

Which features of those recent events should Carol’s brain decide to record?
Should she record where they occurred, or which other persons were present?
Should she remember which shoes she wore or whether the weather was cloudy or clear?
Which of the thoughts she was thinking then should be included in that description?
Where will she store the records she makes–and how will she later retrieve them?
How will Carol represent all those kinds of information? (See Representations.)

Everyone learns from experience. But this raises the question of what one should learn. Most popular theories of learning have been mainly concerned with external affairs. To learn to avoid some situation, according to that point of view, one must exploit some recollection of its sound, smell, or appearance. But we also sense signals from inside our minds–and we sometimes can learn even more from this. Thus, to learn to avoid that bad situation, one might do better to remember "what kind of mental strategy got me into that distressing condition!" In any case, our minds have to guess what probably caused each mistake and success. If we can't select the relevant records, we'll find ourselves wasting too much time. And each record must have the right kinds of connections, or they won’t get recalled when we need them.

Student: *No one could disagree with that–but you still haven’t said where those feelings come in.*

In contrast to the popular view that what we call 'feelings' are plain, basic things, I’ll argue that they reflect our attempts to describe complex cascades of reactions.

> *Some of your systems are always at work to describe your most recent states of mind–but you’re usually not much aware of this. However, as soon as you start to try to reflect–and ask ‘what are my reactions to this?’ then other resources make yet more descriptions, and that process is likely to endlessly grow until you stop reflecting on it*

It’s no wonder that feelings are hard to depict, if they are our names for great cascades that involve such elaborate processes. So in everyday life we just tend to give up and use everyday terms–like *anger*, *sadness*, *joy*, and *grief*–and assume that the others will know what we mean.

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§ 2-6 **Formation of Conscience and Self-Ideals.**

> "*I did not, however, commit suicide, because I wished to know more of mathematics.*"—Bertrand Russell

What sets us apart from the animals? Except, perhaps, for the elephants, few of them spend so much time with their children. Nor do other animals learn so much, or solve so many hard problems. And none of them seem to share anything like our human traditions of ideals and values.

What kind of person would you like to be? Do you want to lead, or to follow the crowd? Are you careful and cautious or brave and audacious? Do you prefer being tranquil or impassioned? Such personal traits depend, in part, on each person's inheritance. But also they are shaped, in part, by our backgrounds of social involvements.

Once our attachment bonds are formed, they become involved with multiple functions. First, of course, they keep children close to their parents or other familiar protectors–and this serve various functions like nutrition, defense, and companionship. But also, as we've been arguing here, they have special effects on how children learn–by providing each child with ways to arrange its goals, plans, and priorities. Furthermore, self-conscious emotions have other powerful effects. Pride tends to make you more confident, more optimistic and adventurous. Shame makes you want to disappear, or at least to make some change in yourself, so you'll never feel that way again, nor ever get into that state again. Of course, self-reproach doesn't usually work, and thinking about it can just make things worse.

Now, what happens when your Imprimers are absent? As adults we all can use those emotions–even *when we're by ourselves*--to evaluate unfamiliar goals, when no Imprimer is present! And frequently, when a normal child considers any unusual act–it will then imagine, in its mind, how its parents might react to that. This then arouses self-conscious emotions–although weaker, of course, than the kind that we feel when Imprimers are actually there on the scene. We all know this experience and call it by names like 'awareness of what's right and wrong' or moral sense' or 'conscience'. It may come in forms of subliminal feelings, or anticipations of future disgrace, or even as a 'still small voice', or the ghost of an absent Imprimer. Our hypothesis is that human attachments not only promote children's safety and nurture, but also engage machinery through which they acquire their "ideals" and "values."

Then, what could be in that machinery? To correctly predict an Imprimer's reactions, our child will need a body of knowledge about that Imprimer's most likely reactions. We'll discuss this in {Self-Images}. That representation could act, in effect, as a collection of values and ideals. Then that system must have some internal connections to make that 'goal-elevator' work–even when no Imprimer is present. We could do this by augmenting that "Imprimer Detector' connection with another path from that self-constructed "Imprimer-Image." Then that structure could serve, in that child's mind, as a virtual *Internal Imprimer*.

> *Now such a child could praise itself, for with such a connection, "imagined" praise could elevate goals from inside the mind. Or, that child could censure itself, and establish new censors and self-constraints.*

At this point that child will have, in effect, an internal system of values–or what is commonly called a 'conscience'. I suspect that Freud meant something like this in mind when suggesting that a child can 'introject' some of its parents' attitudes.

What determines which ideals will grow inside each particular human mind? Every family, culture, club, or group accumulates social and moral codes–by inventing (and passing along) new ways to decide what is right and what is wrong. Those codes of behavior have awesome effects on all of our organizations; they shape the customs, traditions, and cultures–of nations, professions, cults, and religions. They can also empower those institutions to value *themselves* above everything else–till their members are happy to die for them, in endless successions of battles and wars.

How do we get those standards and codes and what makes them become so powerful? I'll parody several philosophers.

> *Social Contractor: There is no absolute basis at all for what we call moral and ethical values. These are merely conventions or social contracts that each of us makes with the rest of us.*

That's a neat theory, except for one thing: no one recalls agreeing to it.

> *Moralist: I deeply believe that our ethical values should be, by their nature, self-evident–except to those minds that have been corrupted by not being raised in a natural state. Genuine morals are not mere 'conventions'. Every person would always be good, if they didn't grow up in bad company.*

It's impossible to agree with that, until you explain what 'deeply' and 'self-evident' mean. Those phrases have bad tastes to me. "Deeply" has the flavor of "*I just can't explain why I believe it*"–while "Self-evident" has the fragrance of "*I don't want to know what makes me believe it.*"

> *Socio-biologist: What we call morals are tendencies that we evolved in ancient times. Thus, certain breeds of dogs were selected for being attached to one master. In humans, we call this trait 'loyalty'.*

> *Fundamentalist: Our values must stem directly from divinely inspired biblical texts–and woe unto those who transgress them.*

> *Theologian: Kant and Spinoza argue that ethical rules can be deduced on the basis of logical reasoning.*

> *Existentialist: None of you seem willing to face the unsolvable predicament that comes when you ask what a person should do. For whichever goal you propose to pursue, then you are still obliged to ask, "What purpose would that purpose serve?"–and you find that you're trapped in a universe where everything's pointless and absurd.*

Logic can help you to figure out what's implied by assumptions that you've already made. You *can* use logic–plus trial and error–to help achieve goals that you already hold. However, logic has no way to help you deduce which assumptions to make, or which goals to adopt in the first place–so we'll need to find some other approach.

> *Mystic: You're right about that. Reasoning only clouds the mind. Never shall you become enlightened until you break free from that vice you call thinking.*

That isn't quite what I had in mind–and I'm wary of ancient mystic beliefs. Some ancient texts may contain good ideas–but then one has to wonder why that 'wisdom' rarely continued to grow over the subsequent centuries–the way that Chemistry went beyond Alchemy. I suspect that many such ideas concealed anti-productive elements that prevented their further development. For example, the Zen instructors discovered that unconscious reactions were sometimes more effective than more deliberate, conscious alternatives. But once that idea was turned in on itself, it suggested that we should terminate more attempts to understand ourselves.

> *Humanist: Isn't this all beside the point? Why should everything need to be purposeful? You're all too concerned with objectives and goals, and too little engaged with humanity. Just watch some children and you will see curiosity and playfulness. They're not seeking any particular goals, but exploring their worlds to see what's there--and imagining what else there could be. You've ignored all the joys of novelties, and the pleasures of making discoveries.*

So it may seem–until you see what might hide behind those pleasures and joys. Curiosity can be purposeful,

too. It makes us build stores of experience that, in later times, may help us out with goals that we've not yet imagined. We like to think that a child's play is casual and free from care–but exploring, learning, predicting, explaining–these are among our most powerful urges. When a child feels 'happy' and 'filled with fun', this may merely hide from that child's mind the power of that drive to 'play'. (You can see that force best when you drag her away.) The playfulness of childhood is the most demanding teacher we have. Never again in that child's career may anything make her work so hard.

Again, what determines each person's ideals? The philosopher Kant maintained, in effect, that this cannot depend on the counsel of others, for no value derived from an external cause can ever really and truly be yours!

> *Kant: "Another may indeed force me to do something which is not my end (but only means to the end of another), but he cannot force me to make it my own end, and yet I can have no end except of my own making. The latter supposition would be a contradiction–an act of freedom that yet at the same time would not be free. But there is no contradiction in setting before one's self an end that is also a duty: for in this case I constrain myself, and this is quite consistent with freedom. The less a man can be physically forced, and the more he can be morally forced (by the mere idea of duty), so much the freer he is. … For if there were none such, then since no actions can be without an end, all ends which practical reason might have would be valid only as means to other ends, and a categorical imperative would be impossible; a supposition which destroys all moral philosophy." –in The Metaphysical Elements of Ethics*

In other words, *If something else caused me to do wrong, then surely the fault cannot be mine*. When someone else forces or causes your choice, then this cannot be a true choice of your own, because only you, by using free will, can make your own free decisions. Thus (he seems to argue) the only moral values must come from yourself; "ethical" behavior can occur only when one can make free choices, and no choice can be completely free when it serves an already established goal. Therefore a moral person must be driven by goals that are not subgoals of other goals. But then, from where could such goals come? Kant goes on to argue that we are forced to assume that such goals have some source.

> "*Consequently as practical reason or as the will of a rational being it must regard itself as free, that is to say, the will of such a being cannot be a will of its own except under the idea of freedom. [The Metaphysic of Morals, 1785]*

Evidently he found it hard to face the conclusion of his analysis–that "free choice" might be nonsensical. For he sees that this would undermine our most popular legal and ethical theories–and leaves us bereft of clear, simple rules for what we should–or ought–to do. It seems to me that the best we can do, short of justifying those ancient views, is to try to develop some technically better ideas about how our minds make decisions. As for how we should make our moral judgments, we may have to do as we've always done, by basing this on our culture's' traditions–because all attempts to 'prove' which precepts are 'good' (such as that so-called *golden rule*) appear to hopelessly circular. Nevertheless, we'll still maintain values, whether or not we can justify them–at least within those large parts of the brain that are not much concerned with philosophy. In any case, we should still attempt to see how our values arise and spread. The following sections will argue that these are largely derived from our early attachments.

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§ 2-7 Attachments of Infants and Animals

"*We want to make a machine that will be proud of us.*" -- Danny Hillis, 1983

The young child Carol just loves to explore, but also likes to stay near to her mother–so whenever the distance between them grows, she quickly moves herself closer. Then, should she discover that she is alone, she'll shortly cry out and look for her mum. That same behavior will also appear even when her mother is near, if there's any cause for fear or alarm–such as the approach of a stranger.

Of course, in Carol's early infancy she had no way to move herself. One thing that sets human infants apart from the offspring of other animals is their virtually total helplessness. Most other mammals, just hours after birth, can walk and follow their mothers around–yet our babies are helpless for quite a few months. Why are we born with such handicaps, and so lengthy a path toward maturity? One popular theory about this says that our brains must be small to facilitate birth; another holds that huge brains like ours simply require more time; I suspect that it's mainly because our brains have evolved to mature in well-spaced stages–to make multiple levels of representations. In any case, to grow such big brains requires a lot of nutrition, defense, and maintenance–and the evolutionary cost of this must be repaid by improving our chances to survive–mainly through better ways to learn

As for our immobility: no human infant would live for long if it could escape from parental care–and its useless legs make sure it won't stray. But that comes with the disadvantage that in those first few months Carol lacked any way to move closer to the mother; it was only late in her first year of age that she 'learned' to crawl and then to walk. (I put 'learned' in quotes because, we know, she already has that machinery–but does not yet have a way to activate it.) Fortunately for our species' survival, we usually come to no harm from this because there's a second bond–in the other direction. For Carol's mother is always aware (to different extents at various times) of what's happening to her daughter–and her full attention will be engaged at the slightest suspicion that anything's wrong. [Perhaps it's because they can't follow their mothers that human infants show few signs of attachment until late in the child's first year.] [Curious that we do not have distinctive names for those two very different relationships.] [Refer to section about dual attachment system.]

Among animals that rear their young, infant attachments promote survival–at least in the case that those infants bonds to persons concerned with their welfare. So in older times it was often assumed that *children would attach themselves to the persons who gave them physical care*–so psychologists said 'caregiver' instead of using some word like 'Imprimer'. But eventually, research on attachment showed that this theory was wrong–as John Bowlby points out in Volume One of his three-volume masterwork "*Attachment, Separation, and Loss*."

> "*That an infant can become attached to others of the same age, or only a little older, makes it plain that attachment behavior can develop and be directed towards a figure who has done nothing to meet the infant's physiological needs. The same is true even when the attachment-figure is a grown-up. … It appears that attachments may develop even when the individuals to whom they are formed have in no way been associated, with physical satisfactions. [John Bowlby, Attachment, Basic Books, N.Y. 1973 p217]*

Then what *does* determine the persons to whom our children will become attached? Here is one rather surprising answer: Citing some research of H.R. Schaffer and P. E. Emerson, ['*The development of social attachments in infancy,*' Monogr. Soc. Res. Child Dev., 29, 3, 1-77, 1964], Bowlby says that:

> "*The variables which determined most clearly the figures to whom the children would become attached were the speed with which a person responded to an infant and the intensity of the interaction in which he engaged with that infant*."

So a child's Imprimers will usually include the child's parents–*but could also include other children*. If so, then perhaps well-informed parents should take special care to examine their offspring's companions and friends–and chiefly, among those potential chums, the most attentive and engaging ones. Also when choosing a child's school, one might examine not only the staff and curriculum, but also the goals that its pupils pursue.

What happens when a child is deprived of Imprimers? An Imprimer's unexpected absence produces a special kind of fear, and a powerful impulse to find that Imprimer.

> *"Whenever a young child who has had an opportunity to develop an attachment to a mother figure is separated from her unwillingly he shows distress; and should he also be placed in a strange environment and cared for by a succession of strange people such distress is likely to be intense. The way he behaves follows a typical sequence. At first he protests vigorously and tries by all the means available to him to recover his mother. Later he seems to despair of recovering her but none the less remains preoccupied with her and vigilant for her return. Later still he seems to lose his interest in his mother and to become emotionally detached from her. Nevertheless, provided the period of separation is not too prolonged, a child does not remain detached indefinitely. Sooner or later after being reunited with his mother his attachment to her emerges afresh. Thenceforward, for days or weeks, and sometimes for much longer, he insists on staying close to her. Furthermore, whenever he suspects he will lose her again he exhibits acute anxiety." – [John Bowlby, Separation p26. Basic Books, N.Y. 1973 ISBN 465-07691-2]*

Surprisingly, this still tends to be true with a parent who chronically mistreat the child. We see similar attachment behavior in our various primate relatives–such as chimpanzees, gorillas, and orangutans–as well as in our more distant cousins, the monkeys. [Ref. to Harlow's discovery that a monkey may become attached to an object with no behavior at all, provided it has certain 'comforting' physical characteristics.]

> *The very detailed observations made by Jane Goodall of chimpanzees in the Gombe Stream Reserve in central Africa show not only that anxious and distressed behavior on being separated, as reported of animals in captivity, occurs also in the wild but that distress at separation continues throughout chimpanzee childhood. During the first year an infant is rarely out of actual contact with mother and, although from its first birthday onwards it spends more time out of contact, it none the less remains in proximity to her. Not until young are four and a half years of age are any of them seen travelling not in the company of mother, and then only rarely. – [John Bowlby, p. 59 Separation.]*

When the mother and child have more distance between them, they maintain their connection with a special 'hoo' whimper to which the other promptly responds–as Jane Goodall herself reports:

> *"When the infant ... begins to move from its mother, it invariably utters this sound if it gets into any difficulty and cannot quickly return to her. Until the infant's locomotion patterns are fairly well developed the mother normally responds by going to fetch it at once. The same sound is used by the mother when she reaches to remove her infant from some potentially dangerous situation or even, on occasion, as she gestures it to cling on when she is ready to go. The 'hoo' whimper therefore serves as a fairly specific signal in re-establishing mother-infant contact."* –Goodall, 1968 [J. van Lawick-Goodall, 'The behavior of Free-living Chimpanzees in the Gombe Stream Reserve,' Anim. Behav. Monogr. I: 161-311, 1968]

Now let's look at some other animals. Early in the 1930s Konrad Lorenz discovered that a recently hatched chicken, duck, or goose will become "attached" to the first large moving object it sees, and will subsequently follow that object around. The same thing happens in many other species of animals. Lorenz called this "imprinting" because it occurs with such remarkable speed and permanence. Here are some of his observations.

> *The chick quickly starts to follow the moving object.*
> *Imprinting begins soon after hatching.*
> *The period for imprinting ends a few hours later.*
> *The effect of imprinting is permanent.*

To what objects will the chick get attached? Under natural conditions that moving object will almost surely be its parents, but if the parents have been removed earlier, then the object could be a cardboard box, or a red balloon–or even Konrad Lorenz himself. At first the chick follows other things too, but during the next two days, as it follows the parents around, it somehow learns to recognize the individual parents and not follow any other geese. Now when it loses contact with the mother it will cease to feed or examine things, and instead will search and make piping sounds, as though distressed at being lost. Then (in the case of the Greylag goose) the parent responds with a special sound–a rhythmic noise with a varying pitch–and moves away from the gosling. Lorenz observes that this response must come quickly to establish imprinting. Later this call is no longer needed, but in the meantime it served to protect the chick against becoming attached to an unsuitable object, such as the moving branch of a tree.

These 'piping' sounds remind us of those ‘hoo’ signals in Jane Goodall’s notes, suggesting that some of our other communication systems could have co-evolved from primitive attachment signals. In any case, we ought to note that these types of birds can feed themselves soon after they hatch–so imprinting is independent of being fed.

For their pioneering studies of animal behavior, Konrad Lorenz and Nikolaas Tinbergen shared a Nobel Prize in 1973. (Also honored was Karl von Frisch–for his work on behavior of bees.) However, it later turned out that imprinting is somewhat more flexible. For researchers like R.A.Hinde discovered that at later times those chicks become fearful of unfamiliar moving things–and that if nothing else moves in its neighborhood, a chick can become imprinted (in that later period) to an object that does not move or respond to that piping sound. This led Hinde to suspect that the imprinting period appears to end only because the new sense of fear forestalls any further 'following'. [R. A. Hinde, "Biological bases of human social behaviour," McGraw-Hill 1974 ISBN 0-07-028932-8.] Similarly, many human babies show a long period of fear of strangers that begins near the start of the second year. Remarkably, even badly mistreated children (and monkeys) may remain attached to their abusive Imprimers. [S Seay, B., Alexander, B. R., & Harlow, H. F. (1964). Maternal behavior of socially deprived rhesus monkeys. J. Abnormal and Social Psychology, 69, 345-354.]

There also is some evidence suggesting that imprinting resembles addiction. Panksepp's experiments (*Emotions and Psychopathology*, Clynes & Panksepp (Eds.), 1988, Plenum Pubs ISBN: 0306429160) suggest that separation-distress may be similar to pain, because it is relieved by opiods. Howard Hoffman [*Amorous Turkeys and Addicted Ducklings*, Authors Cooperative, ISBN 0-9623311-7-1, 1994) speculates that an object can become an Imprimer when certain aspects of its motion or shape arouse an innate mechanism that releases endorphins in the imprintee’s brain. (Hoffman conjectures that the resulting feelings of pleasure or comfort then somehow cause the object to be classified as 'familiar' enough to overcome other fearful reactions.) This seems plausible to me except that, as I'll argue in {Pleasure}, the feelings that we call comfort and pleasure may play a somewhat less direct role.

What happens when a child is deprived of all its attachments? Bowlby’s research showed that when young children are deprived of attachments for just a few days or weeks, they may show signs of impairments for much longer times. Bowlby also cites similar results when Y. Spencer-Booth and R. A. Hinde [Animal Behavior, 19, 174-191 and 595-605, 1971] separated infant Rhesus monkeys from their mothers:

> "*From all these findings we can conclude with confidence not only that a single separation of no longer than six days at six months of age has perceptible effects two years later on rhesus infants, but that the effects of a separation are proportionate to its length. A thirteen-day separation is worse than a six-day; two six-day separations are worse than a single six-day separation. In these regards the effects of separation from mother can be likened to the effects of smoking or of radiation. Although the effects of small doses appear negligible, they are cumulative. The safest dose is a zero dose.*"*– Bowlby, in Separation, p72*

This suggests that prolonged separation can impair a child’s attachments and severely retard that child's progress. A popular view attributes this to damaging that child’s ‘self-image’–by diminishing its ‘self-esteem’.

However, that doesn't explain how this comes about–whereas our 'attachment-goal-elevation ' scheme proposes that these have a direct connection.

Did some of human attachment learning evolve from old systems for infant imprinting? Of course, people are very different from birds, yet both kinds of infants share similar needs–and both may have had common ancestors in the earliest warm-blooded dinosaurs. For example, Jack Horner makes some such deductions about the social lives of a dinosaur species called maiasours, based on discovering that they constructed extensive clusters of bird-nest like structures. [See Chapter 4 of *Digging Dinosaurs*, John R. Horner and James Gorman, Harper and Row, 1998, ISBN -06-097314-5.] Although we know nothing about the degree to which those creatures became imprinted or attached, Horner argues that those nestlings must have stayed in their nests since (because of those parents' enormous weight) any 'following' would be too precarious. Today we know little about how our attachment systems evolved–but with further progress in genomics, we may be able to reconstruct some of those steps.

Returning to the human realm, we should ask how our infants distinguish their mothers. In their earliest hours our infants learn mainly through the senses of touch, taste, and smell. Soon they also distinguish the sound of a voice and start to react to the sight of a head. There is evidence that a newborn responds to a shape with three blobs in its interior. Researcher Francesca Acerra reports that "*4-day-old neonates look longer at their mother's face than at a stranger's face–but not when the mother wears a scarf that hides the hair contour and the outer contour of the head.*" Only two or three months later are able to infants distinguish particular faces. This suggests that human vision uses several different systems. The one that so soon responds to those blobs might have evolved with the principal function: to induce the mother to more like her child! But the attachment-systems that appear much later will need to make better discriminations. As for those birds, Lorenz's geese astonished him by what they *failed* to distinguish.

> "*The human imprinted gosling will unequivocally refuse to follow a goose instead of a human, but it will not differentiate between a petite, slender young girl and a big old man with a beard. … It is astounding that a bird reared by, and imprinted to, a human being should direct its behavior patterns not towards one human but towards the species Homo sapiens. But how does such a bird recognize our conspecifics as 'human beings'?*" [Konrad Lorenz, "Studies in Animal and Human Behaviour," Vol. I, p132, Harvard Univ. Press, 1970].

This also works the other way: an untrained human finds it hard to distinguish among individual geese! Also, it might be important to know that although the following reaction in birds is established very quickly, so the imprinting of adult sexual preference is also established in this period–although it does not appear in behavior until sexual maturity. Such long delays could be relevant to human sexual preference. They certainly has become a concern in repopulating endangered species; it now is the standard policy to for those workers to minimize contact with chicks to avoid imprinting them on humans, lest they later refuse to mate with their peers.

As for how specific those attachments are, here is more from Lorenz's experience.

> "*A jackdaw for which the human has replaced the parental companion, and which has consequently become completely 'humanized', will thus direct its awakening sexual instincts not specifically towards its former parental companion, but (with the complete unpredictability of falling in love) towards any one relatively unfamiliar human being. The sex is unimportant, but the object will quite definitely be human. It would seem that the former parental companion is simply not considered as a possible 'mate'.*"

Still, some studies have shown that after such contact, some of those birds will eventually mate with other members of their species. I once met a biologist who was studying a species of shrimp whose mating pairs stay together for life. I asked how each shrimp could distinguish its mate–for all of them looked the same to me. He shrugged and replied "*I have no idea–except that, so far as I can see, he never lets her out of his sight.*"

Our Imprimers help us to learn many things that others have learned, which saves us from the dangers of many risky experiments. Furthermore, our children must not only learn new rules; *they also must learn new ways to learn*–for example, through the construction of better ways to represent knowledge. I suspect that such skills may be too complex for children to invent by themselves, so perhaps "attachment-learning" gives us ways to acquire those skills from our parents and peers. (For example, each time a child learns a new word, this leads it to form some new idea.) Children who too soon went off by themselves might not have been wise enough to survive; perhaps that helped to make us evolve both the prolonged lengths of our infancies and our schemes for attachment-based learning. As for the older theory that attachment is based on physical nurture, Bowlby found himself forced to admit that this still could play an important role. "*Probably the feeding experience can be the occasion for the child to learn to like to be with others; that is, it can establish the basis of sociability*."

To summarize, we conjecture that the presence and praise of an Imprimer has come to serve as "innate releasing mechanism" (to use Tinbergen's term) for a special system we call the ‘attachment elevator." This system presumably co-evolved along with our abilities to learn and use higher-level symbolic representations. Eventually, these became part of our genetic endowment, via the Baldwin Effect, which promotes the genetic evolution of useful forms of learned behavior. This hypothesis opens many new questions: How might those AND-switches actually work, and how are Imprimers detected? Do different Imprimers play different roles in different realms of mental life–and does each realm engage distinct machinery? What are the roles of parental pride–and a parent's distress when a child won't respond?

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§ 2-8 **Who are our Imprimers?**

> *A JACKDAW, seeing Doves in a place with much food, painted himself white to join them. The Doves, as long as he did not speak, assumed that he was another Dove and admitted him to their cote. But when one day he forgot not to speak, they expelled him because his voice was wrong–and when he returned to his Jackdaw tribe they expelled him because his color was wrong. So desiring two ends, he obtained neither. – Aesop’s Fables*

To help our offspring develop and grow we evolved at least three complementary schemes. First, our infants are born equipped with shrieks that arouse their parents from deepest sleep–and those parents' brains are in turn equipped to find those screams irresistible. Why do those cries affect us so much? A simple theory of how this works is that those cries (somehow) make us feel actual pain–which in turn makes it our topmost goal to do whatever will make that pain stop. See §Feeling Pain and §Empathy. Then later in the child’s first year, attachment systems begin to work at keeping the child close to the parent by causing the child to feel disturbed whenever the parent moves away–and also by making that adult’s mind tend to keep close track of the child. A third scheme based on Attachment-learning depends on the child’s recognition of some its Imprimer’s emotions, as we’ll see in {Recognizing Emotions}. In this section we will only discuss some ways that people choose their Imprimers. [In {Infant Attachment} we mentioned that children tend to become attached to persons who quickly respond to them. What do we mean by "becoming attached?" We form different kinds of relationships with our various acquaintances. Here we’ll mainly be concerned with when children almost literally act as though they actually were ‘attached’– that is, when they follow Imprimers around, and strongly object to separation.]

How many Imprimers can a person have? Many young children have only one. Other may have two, three, four or even more. When a child has several of them, are those attachments interchangeable–or can each of them serve in different way to elevate different kinds of goals? If so, could this induce the child to form several sets of self-ideals, and thus enrich the growth of that personality? Or would having too many different

Imprimers impair the child's development–because too many inconsistencies might prevent it from forming a coherent self-image? We have many questions about such matters, but so far as I know they have not been well studied.

When do attachments begin and end? Even young infants soon start to behave in distinctive ways when in their mothers' presence. However, it is usually not until near the first year's end that the strength of attachment become very strong, and the child protests against separation. In fact, now it learns to become disturbed at signs that the Imprimer *intends* to depart–e.g., reaching for an overcoat. This is also the time when most children begin to show strong signs of fear of unusual things. Both this and that fear of separation begin to decline in the child's third year–so that now the child can be sent to school. However, we do not see any such decline in the roles of those other, self-conscious emotions that govern attachment-based learning. These persist for much longer times, and sometimes perhaps for the rest of our lives.

> "*During adolescence a child's attachment to his parents grows weaker. Other adults may come to assume an importance equal to or greater than that of the parents, and sexual attraction to age-mates begins to extend the picture. As a result individual variation, already great, becomes even greater. At one extreme are adolescents who cut themselves off from the parents; at the other are those who remain intensely attached and are unwilling or unable to direct their attachment behavior to others. Between the extremes lie the great majority of adolescents whose attachments to parents remains strong but whose ties to others are of much importance also. For most individuals the bond to parents continues into adult life and affects behavior in countless ways. Finally in old age, when attachment behavior can no longer be directed to members of an older generation, or even the same generation, it may come instead to be directed towards members of a younger one*." [Bowlby, *Attachment*, p207]

What happens in other animals? In those that don't form larger herds, attachment frequently only persists until the offspring can live by themselves. In most species it's different for females than males, mainly because of evolutionary selection against inbreeding. In many such species the mother will actively drive the older young ones away as soon as another child is born–while in other cases attachment will stay until the time of puberty or even later, especially for females. In *Attachment* (*p182)* Bowlby *mentions* a phenomenon that results from this:

> "*In the female of ungulate species (sheep, deer, oxen, etc.), attachment to mother may continue until old age. As a result a flock of sheep, or a herd of deer, is built up of young following mother following grandmother following great grandmother and so on.*
>
> "*Young males of these species, by contrast, break away from mother when they reach adolescence. Thenceforward they become attached to older males and remain with them all their lives except during the few weeks of each year of the rutting season.*"

Evolutionary psychology would suggest that each case might be somewhat different, because different sizes of groups will be differently suited for different environments; for example, the size of the flock may depend on the character and prevalence of predators, etc.

Why should we need Imprimers at all–and why should we be so exclusive in how our brains make us choose them? Why not simply elevate goals in response to anyone's censure or praise? There's an excellent reason why we should be made to be very selective in this domain–for if any stranger could program your goals, you'd always be in the most extreme danger, because strangers would not share your interests. It's different within your own family, because evolution selects for the genes of those who promote their offspring's welfare.

However, when we look more closely at the concept of 'welfare' we see that this can have different meanings. For example, Bowlby argued that our attachments are mainly for our children's physical safety, and I'll

paraphrase his argument on p266 of *Attachment*.

> *"That protection from predators is by far the most likely function of attachment behaviour is supported by three main facts. First an isolated animal is much more likely to be attacked than is one that stays bunched together with others of its kind. Second, attachment behavior especially easy to arouse in animals that, by reason of age, size, or conditions are especially vulnerable to predators. Third, this behavior is strongly elicited in situations of alarm, which are commonly ones in which a predator is sensed or suspected. No other theory fits these facts."*

When Bowlby referred to "other theories" his main concern was to refute what then was still a popular view– that attachment's primary function was to ensure a dependable source of food. For, as we mentioned in {Infant Attachment} he had already become convinced that physical care (including nutrition) did not play a crucial role in attachment. He concluded instead that security must be the most important factor. I suspect that this was largely correct, at least for many animals. However, so far as I can see, Bowlby did not conceive the idea that attachment in humans might directly promote our absorption of values and high level goals.

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§ 2-9 **Self-Models and Self-Consistency.**

To be able to solve a 'difficult' problem, one must be able to work out a plan. But there's no use to making a ten-step plan unless you'll be able to carry it out; it won't do you much good if you quit at step three. This means that you'll need some 'self-discipline'– which in turn means enough self-consistency that you can predict, to some extent, what you're likely to do in the future. We all know people who make clever plans but rarely manage to carry them out because their models of what they're likely to do don't seem to conform to reality. But how could a trillion-synapse machine ever become predictable?

Consider how remarkable it is that we can describe a person with words. What makes it possible to compress an entire person into a short phrase like "Joan is tidy," or "Carol is smart," or "Charles prefers to seem dignified"? Why should traits like these exist? Why should one person *generally* tend to be neat, rather than be tidy in some ways and messy in other ways? Here is one way this could come about:

> *In the course of each person's development, they tend to evolve certain policies that are so systematic and consistent that we (or our friends) can recognize them in the forms of what we call features or traits–and these become parts of our self-images. Then when we formulate our plans, we can use those traits to predict what we'll do (and thus reject schemes that we know we won't do). Whenever this works we're gratified, so then we continue to train ourselves to behave in accord with these simplified descriptions. Thus, over time our imagined traits proceed to make themselves actual!*

Of course, these simplified self-images can never be wholly accurate, and we never really come to know very much about our own private processes. What we call traits are only the few consistencies that we learn to perceive. Still, sometimes even these may suffice to help us conform to our own expectations.

This process, when it works out well, thus provides us with "Self-Reliance." We all know the value of having friends who usually do what they say they will do. But it's even more valuable when you can trust *yourself* to do at least some of what you have offered to! And the more you're able to trust yourself, the more you can simplify yourself–until you become your own caricature. But how do those traits originate? Surely these can be partly genetic; we can sometimes perceive them in newborn infants, when some seem placid and others, excited. However, other traits seem quite clearly acquired and, presumably, largely from those children's Imprimers.

This does suggest that there might be some risk in becoming attached to too many different personalities–if this leads to attempting to model yourself upon too many different sets of traits. Then your plans might only rarely work, and the process of planning itself might then scarcely ever get reinforced.

If a child has only a single Imprimer, (or several that share consistent values) the child will usually know what to do. Persons with coherent aims will more successfully compete against those encumbered by conflicting goals–because efficiency is the currency of evolution's marketplace, and a person working toward fewer goals will have more time and energy to acquire the skills to achieve them all.

Consistency also promotes relationships in which others feel safe in depending on you. And this also applies inside your own mind: There is little value in making a plan that you are not likely to carry out, because it conflicts with your other goals; if we changed our minds too recklessly, we could never predict what we might want next. We'd never be able to get much done if we could not "depend on ourselves." Still, we must also be able to compromise, because it would be dangerous to commit oneself to some long-range plan with no way to ever back out of it. *We must be wary of changing ourselves in ways that prevent us from ever changing again.*

What if a child gets attached to several Imprimers who have very dissimilar goals? A person with too many different ambitions may end up with few skills for any of them–or become unable to decide which new goals it ought to acquire. In any diverse society, each child must deal diverse views–and parents usually have concerns about the values their children acquire, and hope that that those children will not get attached to persons of ‘dubious character’;

> *In the l950s my friend Arthur Samuel, a computer designer at IBM, developed a program that eventually played a remarkably good game of Checkers and defeated a master-level player in 1962. It included some machinery that allowed it to learn from experience–and its quality of play would tend to improve when it played against superior players. However, after playing against inferior players the program itself would tend to get worse–so that once the program was very good, Samuel had to turn learning off. In the end he permitted it only to play against records of master-class championship games.*

When anyone interacts with you, they’re likely to have a purpose or two, so you have to try to assess their intentions. While parents may tend to offer advice that they expect to benefit you, businesspersons may have more concern for the welfare of their firms. Religious leaders may wish your well, yet be more concerned with their temples or sects, and with propagating their tenets and faiths. And when your President praises your nation, expect to be asked to sacrifice your life to define some vague boundary line. Each organization has its own values, motives, intentions, and goals–just as though it was a person.

> *Humanist: I hope you don’t mean that literally. An organization is nothing more than the circle of persons involved with it. It cannot have any goals of its own, but only those that its members hold. No company can be considered alive, or conscious, or able to have ideas–no matter that it legally may be treated as like an entity.*

On the contrary, I'll argue in {Goals} that non-human systems can have 'intentions’. What *is* a person, after all, but a network of interconnected resources. We'll see how such systems can be designed so that they can have goals of their own–some of which can be quite opposed to the personal goals of their members.

Consider how members recruit for their cults. First they remove you from all your old places, and then they help you to ‘decide’ to break all your other social attachments–and especially from all your family ties–until you're detached from all of your friends. Now it is easier, step by step, to undermine all your other defenses–so that now you can be imprinted by their local savior, saint, or prophet. It seems that there indeed are schemes through which any stranger *can* program you–provided they know the proper techniques with which to excise and supplant your ideals.

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§ 2-10 Public Imprimers

In proposing the theory idea of attachment-based learning, we've only discussed how it works "in person"–that is when a child is with an established Imprimer. However, it occurs to me that this might be related to another larger-scale phenomenon–in which huge hordes of persons are influenced by people who 'catch the public's eye' by appearing in broadcast media. We see this in commercial advertising, whose goal is to implant the idea that some 'product' is desirable. One way to do this would be to present objective evidence that the product is useful. However, it appears to be more effective to use the so-called 'testimonial', which scarcely displays the product at all, but suggests instead that its use is approved by some popular actor, singer, model, or other type of 'celebrity'. Why are these techniques so effective? Perhaps because those particular persons have ways to evoke an impriming response and thus more directly modify the personal goals of their audience.

> *Critic: Does this really require such an explanation? Your elevator theory might work for attachment, but now you're seeing it everywhere. A simpler explanation would be that the advertiser just uses the celebrity to attract the viewer's attention.*

You may be right, but we still should ask what might have made those 'celebrities' popular. An actor or singer may 'go high in the charts' for having attractive physical features–but those people also tend to be skillful at simulating emotional states; athletes in competitive sports also must be accomplished at deception. Good leaders must be good liars, too. More seriously, it seems to me, a popular actor or singer must know certain ways to make each listener feel some special sense that "*this important person is speaking to me*." The result is to make one feel more involved–and therefore more compelled to respond –in spite of this being a monologue! What techniques could produce this effect of so firmly engaging a listener's mind?

> *Critic: Perhaps this sometimes just happens when the 'celebrity' takes the 'center stage'–regardless of how that came to be–because this makes the audience focus its attention there. Then once most listeners get so engaged, it is harder for any of the rest to try to be different from everyone else.*

Perhaps–yet not everyone can control a mob. We still don't know enough about how our "Public Imprimers" are able to arouse their followers' attachment machinery–that is, assuming that this is what happens. Could it be that those celebrities know special techniques for establishing rapid attachments? Are these among the secret tricks through which certain people can establish themselves as leaders, with unusual powers to mold our goals? Consider how many dictators assumed their thrones, by using what is sometimes called 'Charisma'.

> Charisma: n. *'a rare personal quality attributed to leaders who arouse fervent' or "an extraordinary power, such as the ability to perform miracles'.*

But do we know any physical features that act as 'charismatic releasers'" Does it help for such a person to have a large stature, or have a deep voice, or show a mature and commanding face–or have a confident manner or dignified bearing? Are there other superficial features that might evoke that sense of charisma?

> *Critic: It's hard to see any general rules. Tallness tends to attract more attention, but there have been effective diminutive leaders. Perhaps there are features of oratorical style–yet certain leaders, dictators, and preachers rant and shriek–while others speak with carefully measured phrases and pauses. Still, I see a problem with your theory: In a public monologue, there's no room for individual response–so such situations are missing your critical factors for in making attachments–namely ' speed and intensity of response'.*

Yes, but rhetoric can create that illusion. An oration that has the right kinds of timing can seem like a ‘virtual interaction’ by *entraining some of the listener's thoughts, by first raising questions in their minds–and then swiftly and aptly answering them*. Then although that there is no real dialog, each listener comes to feel the sense of receiving a personalized response. Perhaps the trick is for the speaker never to leave quite enough time for those listeners to form their own thoughts, or to formulate other objections. Note that the speaker does not need to control the thoughts of everyone in that audience, because it may suffice only to win over enough of them. Then peer pressure can lead most of the rest to join in with them. Of course, it can also go the other way; many performers claim to depend on reactions from their audience.

> *Glenn Gould: For me, the lack of an audience--the total anonymity of the studio--provides the greatest incentive to satisfy my own demands upon myself without consideration for, or qualification by, the intellectual appetite, or lack of it, of the part of the audience. My own view is, paradoxically, that by pursuing the most narcissistic relation to artistic satisfaction one can best fulfill the fundamental obligation of the artist of giving pleasure to others. " –[From a 1961 letter to Mrs. H. L. Austin].*

In any case, we often see 'virtual dialogues' in evangelical sermons where the preacher elicits some clear-cut reactions and then very quickly ‘responds’ to them. Then many listeners seem to respond with reactions like the ones that come with a genuine intimate conversation. Similarly, when you lecture to an audience that has hundreds of ‘participants’; there is never time to converse with each, but there’s plenty of time to interact–entirely inside your mind–with one or a few model listeners.

A person can also become attached to an entity that doesn’t exist–for example, to a legendary historical figure, to a fictional character in a book, or to a mythical hero, martyr, or god. These, too, can seem to become "virtual mentors" who engage us from inside our own minds. A person can even become attached to an abstract doctrine, dogma, or creed–or an icon or image that represents it. Indeed, when you come right down to it, *all* our attachments are made to fictions. For you never connect with an actual person, but only to your internal conception of what that person represents–no matter whether that's based upon a parent, teacher, friend or peer–or merely a transient attraction.

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