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**The Significance of Consilience: Psychoanalysis, Attachment, Neuroscience and Evolution**

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From shortly before the start of this century students of the mind began increasingly to relate psychoanalysis to both developmental psychology and neuroscience. A recent example is a neuroimaging study by ten collaborating authors on the effectiveness and mode of action of psychoanalytic therapy in treating depression (Buchheim, et al., 2012). This attempts to co-ordinate converging research from a number of fields—including psychoanalytic theory, attachment research, and neuroscience—to relate the way depressed patients have improved during psychoanalytic therapy to hypothesized alterations in their internal models of their emotional bonds with their parents.

Although such convergences have been accumulating over many years, they have as yet been given little attention in overall assessments of psychoanalytic theory, particularly in the philosophy of science. So in what follows I want to consider the consiliences upon which this study draws in more detail, and discuss what they mean for the understanding of psychoanalysis more generally.

Research of this kind began in disciplines that were regarded as separate from one another, and is conducted in theoretical vocabularies that—like most human concepts—remain distinct and irreducible. But we are now well aware that radically different concepts or vocabularies can constitute compatible ways of understanding the one world—including our bodies, brains, and the minds these realize—that we describe in terms of them. So let us begin by sketching a framework for thinking about explanation, confirmation, and disconfirmation that may facilitate comparisons among irreducibly different theories in different but connected fields.

**1. Causal explanations as working hypotheses tested by data they explain.**

In these theories—in almost all theories—we can regard ourselves as framing causal explanations by proposing causal hypotheses to explain data we want to explain. Characteristically we do this because although we accept the data (they are, after all, data), we cannot see, and want to understand, *why the data are as they are*.

Our hypotheses explain and unify data by integrating them into larger but hypothetical causal patterns—those produced (caused) by the causal mechanisms or processes that the explanations hypothesize. So such hypotheses explain why the data are as they are, in the sense that they enable us to see that the data are as we should expect them to be, given the causal mechanisms and processes by which they are explained*.* And it is because an hypothesis enables us to see the data as expectable in this way that we accept that hypothesis as providing a good explanation of the data with which we are concerned.

Such explanatory hypotheses perforce predict the data they explain. A degree of prediction is inherent in showing that the data are as we should *expect* them to be, given the hypothesis that explains them. For in this data are represented as *expectable* in a way they were not before we brought the hypothesis to bear on them, and as they would not be, given the negation of the hypothesis. Explanatory hypotheses that are predictive in this minimal sense are therefore liable to confirmation or disconfirmation, in basic sense that we regard the probability of the data given such an hypothesis as greater than the probability of the data given the negation of the hypothesis.

Using ‘P’ for ‘the probability of’ can write this as P(D given H) > P(D given not-H). Probability is standardly measured by numbers between 0 representing certain falsity and 1 representing certain truth, so that the probability we would assign to the H that a fair coin flipped randomly will land heads would be .5. The probabilities we can assign to H and D can vary in this range. We may regard the probability of what we are taking as data as approaching 1, but when we seek to explain data so as to see why we might expect them to be as they are, we are considering what their probability *would be*, had they been generated in accord with the explanatory hypothesis we are considering. This will differ from hypothesis to hypothesis.

To appreciate this let us simplify some of our intellectual history and imagine ourselves in the position of people who have not yet become clear that the earth moves, and are beginning scientific observation by charting the movements of the clearly visible celestial objects (the stars and planets) in the night sky. Having done this over a long period, we are struck by the regularities in the data we have accumulated, for example by the nightly movements of the constellations around the North Star, which seems nearly immobile in relation to them. Taking these naked-eye observations as our data, we want to know why they are as they are. Since we have made them by fallible eyesight, and we using records from observers that may not perfectly agree, etc., we cannot take all our data as certain. Still we can be clear that overall the data accord with generalizations such as that above.

We can also imagine that we have framed one of the first great explanatory hypotheses, namely that the celestial objects are on a sphere that moves around the earth, as described in Kuhn (1957). We could test this by building small models of the earth as surrounded by such a sphere, or a map of the sky as it would appear in looking up at such a sphere, or even better by constructing a sphere – a partial model of the universe as we are conceiving it -- to which we can attach lights representing the celestial objects in their relative positions in the sky. In this case we can imagine that an observer can sit inside the sphere (as in a planetarium) to see how well rotating it generates hypothetical data—appearances to the observer inside the sphere—that match those we record for the celestial objects themselves.

This would be a way of estimating the P(D given H) for the H we have framed, via a model of the generation of the data that we could use to reproduce them. Probably we would find that between the difficulties in observing and recording the data and those of building a sphere to try to reproduce the data everything would be more or less approximate. Still even in these circumstances we might find that the movements of the main constellations were modelled fairly well by their representations on our sphere, so that P(D given H) would seem high for them. For others, such as the morning star and the evening star, we would find that their movements were not well modelled in this way, so that P(D given H) apparently went towards nil.

In light of this we might tentatively accept our hypothesis and model as a good explanation, and the best we can frame, for the movements of the ‘fixed stars’; but as not yet providing a satisfactory account of the ‘wanderers’ or planets. Focussing on them, we might attempt to explain their motion—say by modelling their movement with wheels attached to the sphere, which were free to move in further ways that we could attempt to specify.

As this illustrates, when we explain data by hypotheses, those data become evidence by which the hypothesis can be tested. For by Bayes’ theorem (see Joyce, 2008; Talbot, 2011; Hawthorne, 2012) the credibility (probability) we assign to an hypothesis given data it succeeds in predicting [P(H given D)] should be greater than the credibility or probability [P(H)] we assign to the hypothesis prior to the prediction. But for data so to increase the credibility (probability) of an hypothesis that predicts them is for those data to confirm that hypothesis; and likewise for decrease in probability and disconfirmation; and this will be so just if P(D given H) > P(D given not-H), as above.[[1]](#endnote-1) So inference to the best explanation, taken as a form of Bayesian abduction (Douven, 2011), naturally renders causal hypotheses that explain data testable by reference to them. In such an account, which I have briefly applied to clinical psychoanalysis elsewhere (Hopkins, 2013; see also the recent discussions in Lacewing, 2012; 2013), causal explanation and unification go hand in hand with testability, and in whatever domain they are found.

**2. Causal explanation in Darwin.**

To understand the role of these concepts in psychoanalysis it may be useful to compare their role in Darwin’s account of natural selection. Few would deny that Darwin’s hypotheses have been highly confirmed. But they also have striking methodological similarities to those of Freud —similarities, for example, that led the celebrated philosopher of science Sir Karl Popper to declare both theories unscientific, and on nearly identical grounds.

Popper’s claim that Freud’s theories are not scientific but ‘metaphysical’ because they are not (what Popper called) *falsifiable* is well known. In calling a theory falsifiable Popper meant that it was comparable to a generalization like ‘All swans are white’, which could be falsified by a single instance or datum (a single black swan). This is evidently a great simplification, since observing white swans and hypothesizing that all swans are white seems a much simpler thing than trying to get to grips with the kind of observational data considered in our already simplified scientific example above. Still we can say that Popper was taking an hypothesis as falsifiable, and so scientific, just if it predicted the data D that it was meant to explain with near certainty, so the P(D given H) approached 1. (Given that all swans are white, the probability that any swan observed will be white is 1.) In this case P(not-H given not-D) would also approach 1, so H would be refuted. This simple and straightforward account won many converts, although it (apparently arbitrarily) restricted the probabilities that could be considered in thinking about confirmation and disconfirmation to those approaching 1 or 0, and so left most actual scientific data out of account.

Popper seems to have applied such an account in assessing Darwin and Freud; and since their hypotheses rarely predicted the data they explained with a probability approaching 1 he found them wanting. In the case of Darwin, acknowledged by almost everyone as among the greatest of scientists, Popper (1978) argued that it was “important to show that Darwinism [by which he meant the more recent versions of Darwin’s theory held by evolutionary biologists] is not scientific but metaphysical.” So as he argued, using ‘testable’ as if it meant ‘strictly falsifiable’:

Darwinism…is metaphysical because it is not testable…Darwinism does not really *predict* the evolution of variety. It therefore cannot really *explain* it…there is hardly any possibility of testing a theory as feeble as this (Popper, 1978, p. 136).

Here the feebleness that Popper ascribes to Darwin’s theory is apparently the inability to ‘really *predict’* that data it covers, that is, to predict it with a sufficiently high probability. This he apparently took to show that the theory also cannot ‘really *explain’* – as if we could not really determine why something had happened unless we could have predicted it.

But while dismissing Darwin’s theory in this way, Popper, who rightly admired Darwin, also tried to do justice to it. So he stressed that the theory had been ‘invaluable’ in adding to the growth of knowledge. He illustrated this by saying “it is clear that we are helped by the theory of natural selection” in “trying to explain experiments in which bacteria become adapted to, say, penicillin”. This was because the theory “suggests the existence of a mechanism of adaptation, and it even allows us even to study in detail the mechanism at work. And it is the only theory at all which does all that” (Popper, 1978, pp. 136-7).

It has now been widely recognized that Popper’s description of Darwin’s theory as non-scientific, non-explanatory, and ‘feeble’ is incoherent, given his acknowledgement of the unique role of the theory in guiding biological research and experiment. This is clear in the very terms of his account. To say that in experiments certain bacteria have ‘become adapted to penicillin’ is not just to ‘suggest the existence of a mechanism of adaptation’. Rather it is to assert that there is a particular kind of mechanism in particular organisms, and that this mechanism has operated in a specific and predicted way in experimental conditions. The claim, roughly, is that the bacteria in question: (i) have particular mechanisms of reproduction; (ii) that these enable them to reproduce themselves with heritable variation, including variants that can survive in various concentrations of penicillin (as determined by experiment), and; (iii) that, as predicted by Darwin’s theory, the superior reproductive success of these variants in these circumstances produces populations that are penicillin-resistant.

This is clearly a scientific hypothesis predicting experimental results that accord with Darwin’s theory. Popper could say that it did not *really* predict only if by ‘*really* predict’ he meant ‘predict with near certainty’, which, as noted above, would be arbitrarily to restrict the probabilities that might be considered in assessing prediction and confirmation or disconfirmation. Moreover since Popper was reporting on experiments that had already been done, this was a scientific hypothesis that had already been confirmed by experiment, and one whose confirmation was already taken to support Darwin, although not in the way Popper required.

The kinds of experiments Popper was describing, moreover, were direct applications of Darwin’s original hypotheses. Darwin had begun his account by describing the longstanding agricultural practice of selective breeding, and these were experiments in the selective breeding of bacteria. So here the science was an extension of common knowledge as well. In particular, people had known for centuries that:

1. Living things have physical mechanisms of reproduction (differentiating male from female organisms, for example), whose working
2. yields the kinds of similarities between parents and offspring that impel us to regard them as members of the same species, and also
3. yields differences between parents and offspring—variations that can be bred from, and so are heritable, as can be readily observed in families, fields, and farms.

Such general but commonsense understanding of heritable variation and selective breeding lay behind the selective breeding of bacilli in controlled experimental conditions by which, as Popper records, the commonsense generalizations have been extended and refined and the mechanisms underlying them specified. Such extension of commonsense causal understanding is an important part of both causal explanation and scientific progress.

**3. Causal explanation and scientific progress.**

In causal explanation, as said above, we hypothesize causal mechanisms in order to explain particular data as effects of these mechanisms. This means that we almost inevitably start with hypotheses that explain many fewer data, and much less rigorously, than we will do as explanation progresses. The path to the precise and all-encompassing theories of Newton and Einstein started with hypothesis about the movements of the visible celestial objects like those discussed above: that these objects moved as they did because they were (in some way) attached to (some kind of) spheres that (for some reason) circled the earth.

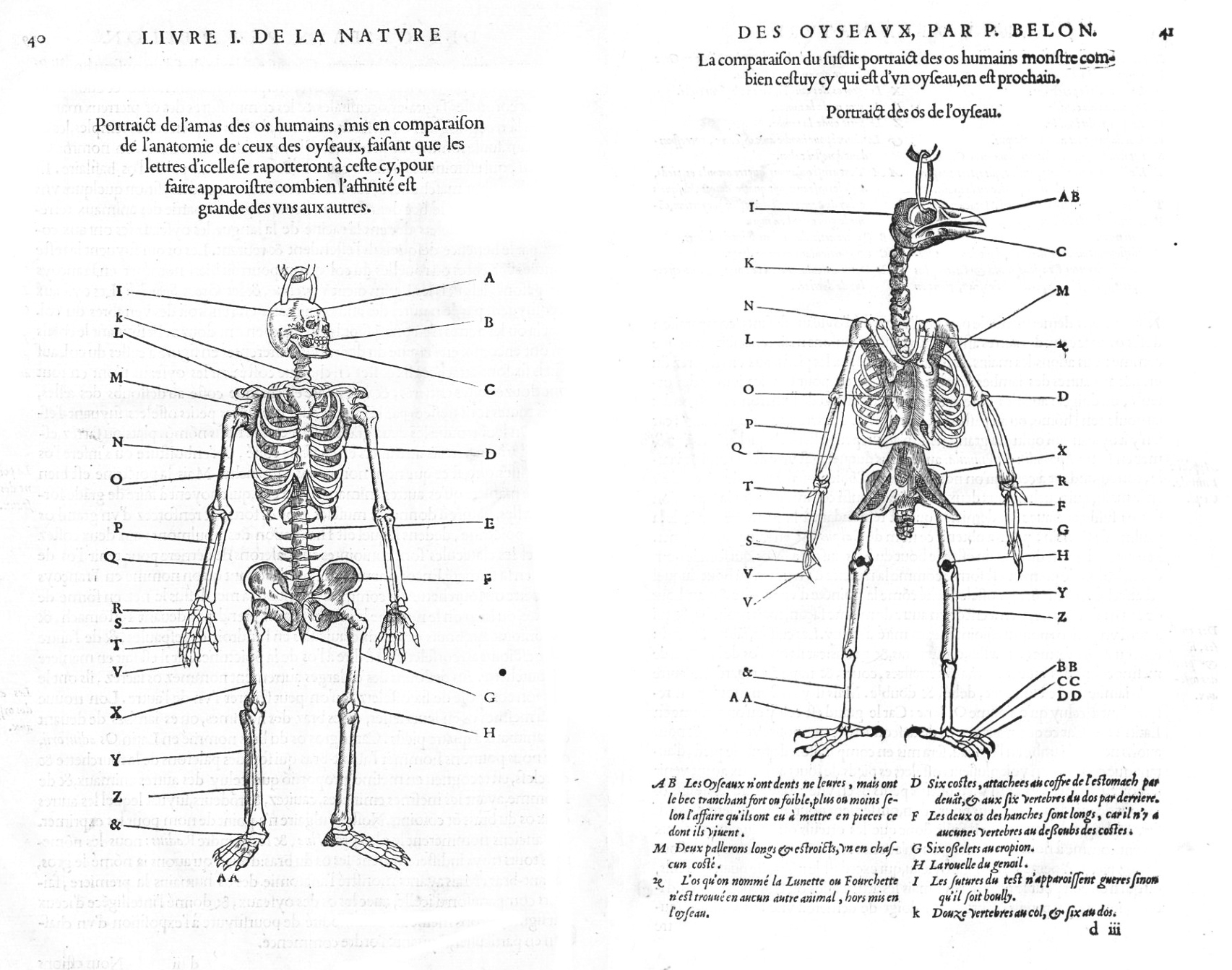
The vagueness of this initial form of hypothesis did not deprive it of explanatory power and practical utility, and the progress begun with it constitutes an important part of the history of science. So let us note, first, that in such progress we characteristically start with hypotheses that initially improve our ability to unify of the data more than our ability to predict them. This is because the data have already attracted our attention as having common features that we feel cannot have arisen by mere chance, and so already seem to require unification as effects of a causal mechanism. The regularities in the way celestial objects moved, such as the predictable progress of the constellations in the night sky, had been noted from before historical record.

In such a situation the framing of a particular hypothesis – even a relatively vague one -- about how the data are generated is an important step forward. Even if the hypothesis does not enable us to predict the data that have drawn our attention better than before, it will enable us to draw further conclusions about them (e.g., if they are on a sphere they should move in a uniform way). This will enable us to gather further data with an eye to confirmation or disconfirmation (do they actually move in a uniform way?) and so to focus on data that require further explanation (the planets move differently from the fixed stars). The hypotheses we frame to explain these data may elaborate the initial one, and so remain as consistent as it with common sense (there are mechanisms on the sphere that produce the planetary movements). But also they may differ from the original one, and from common sense, in deep ways (the earth itself is a planet, and a satellite of the sun).

If these more radical hypotheses prove better (no epicycles, a single form for all motions, consistent with data from telescopes, etc.) we can adopt them as our main working hypotheses, despite their departure from common sense (the earth moves, we are not at the centre of the universe, etc.). Then the process or refinement and replacement of hypotheses starts again (Kepler, Newton, Einstein…). But this also means that the most important scientific hypotheses are liable to take us further and further from commonsense ideas that are also important in our lives. So, inevitably, those less concerned with understanding the data will have greater reason to reject the hypotheses as destructive of the common views they cherish, and to resent those who have encouraged this destruction by framing them (Copernicus, Darwin, Freud). This too is a characteristic part of progress in causal explanation.

**4. Common sense and causal explanation in Darwin.**

We can see this a bit more clearly by considering a diagram from *L'Histoire de la nature des oyseaux*, published in 1555 by the French naturalist and diplomat Pierre Belon.[[2]](#endnote-2)



Here Belon charts a sample of the kinds of the data about plants and animals that, in his view (as that of very many others prior to Darwin) required to be explained. Although such similarities and differences had been observed many times, no one had been able to understand why they were as they were—why they should be *expected to be* as they had been observed to be. The similarities in these skeletons are particularly puzzling because they appear at the joints and bones of nature itself. We know that similarities and differences like these would be replicated in skeletons and structures of countless living things. So they indicate many natural kinds of similarities among living things that seemingly could not arise by chance.

As in the case of the movements of celestial objects, such similarities require explanation as effects of a causal mechanism; but it is not easy to see what sort of mechanism this could be. Even if we were to take them as fashioned by a Creator, why should He or She make humans to be so much like chickens? (Or again, as Darwin remarked, the creator would seem to have been inordinately fond of beetles…). And if humans are so like chickens, why are they also so different? This too points to a vast range of things that could not be a matter of chance, and hence require a causal mechanism to explain them.

Darwin explained such data about similarity and difference by *extending* the long-familiar common sense ideas about living things that we set out just above. These were: (i) that they reproduced or replicated themselves via physical mechanisms of inheritance that yield the kind of similarities in virtue of which we regard them as members of a single species, and; (ii) that these mechanisms also yielded the breedable (heritable) differences among plant and animal parents and offspring that were familiar to all who took the trouble to observe them.

**(a) Darwin’s extension of common sense**.

Darwin’s extension of these similarity- and difference-producing roles yielded his account of evolution as proceeding by a process of *descent* (producing similarity) with *modification* (producing difference). Roughly:

1. Darwin extended the role of the mechanisms in producing inherited similarities, so as to explain data consisting in similarities between organisms that were members of distinct species. These could readily be observed, both superficially (in examples such as lions and leopards, horses and zebras, apes and humans) and also (as naturalists like Belon had noted) between species otherwise as different as humans and chickens. (And likewise for the fossil remains of past species.) Such similarities, Darwin held, were as might be expected—such as might be thought probable—given his hypothesis that the organisms in question shared common and perhaps simpler ancestors, from a time in the long history of life on earth before their species had become differentiated.
2. Darwin likewise extended the role of the mechanisms as producing heritable differences (variations), so as to explain data consisting in differences between varieties within species, and again differences between members of different species. Again these included the small but crucial differences that prevented members of very similar species from breeding with one another to produce fertile offspring, as well as the larger differences between species like Belon’s human and chicken (And likewise for fossil species.). These differences, Darwin held, were such as might be expected, given his hypothesis that living organisms were continually modified over repeated generations. This, as he explained, occurred via their participation in an inescapable reproductive competition, that preserved, and so accumulated, heritable differences that augmented reproductive success. Indeed such modifying accumulation, operating on a single original kind of reproducing organism, might be expected—over the countless generations and situations of the very long history of life on earth—to produce “from so simple a beginning” the “endless forms most beautiful and most wonderful”, that “have been, and are being, evolved” (Darwin, 1859, p. 490).

This again illustrates how scientific hypotheses can be developed by extending ideas that are already accepted as matters of common sense and common observation, as well as how upsetting such hypotheses can be as they progress further and further from common sense. (We are descended from apes, and worse, from forms like amoebas and bacilli, and like them we are adaptations that exist because they facilitate the replication of genes.)

They also illustrate the particular point that such hypotheses can combine great explanatory scope with relatively weak prediction, by enabling us to see how a large range of data are as we should expect them to be, given the causes hypothesized to explain them; and how such hypotheses can be confirmed by the breadth of their explanatory role. On this point Darwin gave a far better account than Popper as to why his hypotheses should be accepted. He urged that we should credit them because they explained a great range of phenomena that no others did, and also because these explanations were predictive in the weak but essential sense we set out at the beginning.[[3]](#endnote-3)

This seems right, although the probabilities involved are intuitive, unquantifiable, and (as Darwin himself stressed) insufficient to support precise predictions. It seems also to be why, although arousing vehement opposition, Darwin’s theories were from the outset recognized *by those who studied them together with the data* (although not, of course, by many others) as confirmed by their explanatory role.

**(b) From weak but broad prediction to strongly confirmed science**

Taking the history of science subsequent to Darwin into account, we can also see that his hypotheses illustrate an important scientific possibility, and one that may also be realized by Freud’s. This is that causal hypotheses that predict only weakly but explain very broadly (as do both Darwin’s and Freud’s) *may have these features because they strike deeply into the nature of thing*s. They do this by recruiting causal mechanisms that operate over the broad range of phenomena that they serve to unify, and so are common to many things and processes. Given that this is so, these mechanisms—however vaguely they are initially specified—may prove important for understanding in many fields.

In this, however, their role can be fully appreciated only *after* the mechanisms have been understood more deeply, and in the fields that specify their working more precisely. This will be especially so if, as in both Darwin and Freud, the initial hypotheses are cast in a vocabulary that differs from those of the scientific disciplines that are destined to draw out their consequences. In this case the deeper understanding of the mechanisms that these disciplines permit will be framed in concepts, or modes of explanation, that differ, perhaps radically, from those of the original hypotheses—as Freud’s original psychological hypotheses cast in terms of memory, emotion, desire, and belief differ from those of the explanatory vocabularies (including, in Freud’s case, the vocabulary of neuroscience) in which the causal mechanisms recruited in these hypotheses require to be elaborated.

In such a case the deeper understanding of the mechanisms may yield better predictions, but these will be evident mainly in the conceptually disparate disciplines in which their working is specified. If we describe the mechanisms generally but vaguely, as in the initial hypotheses that specify them, then we can use them to predict only weakly. But when we describe them in more detail in other disciplines, although this generates better predictions, it does so only in terms articulated within these disciplines, and in the range of cases then under investigation. So we may gain a better understanding of the mechanisms, and a deeper sense of the explanatory power of the original hypotheses, while leaving the predictive weaknesses of the hypotheses that indicate the full scope of the mechanisms intact.

This is arguably what we find in the unification of Darwinian natural selection and the molecular biology of reproduction. Our increasing knowledge of the mechanisms of heredity has gone with attaining many stronger generalizations down to sub-cellular and molecular levels. These, however, still do not enable us to predict how even single-celled organisms like bacilli will evolve outside controlled conditions. At the same time, and despite this continuing predictive weakness, the generality of Darwin’s hypotheses has entailed that this deeper understanding has brought far stronger confirmation of those hypotheses than anyone might originally have been thought possible.

Darwin’s original hypotheses entailed that ‘the endless forms’ would bear similarities inherited by descent from their ‘simple beginnings’. In learning about the mechanisms of reproductive inheritance we have learned that all living things reproduce themselves via a relatively small family of molecules and processes (DNA, RNA, the production of peptides, and so forth). On the account we have given the fact that these same molecules play a central role in producing the ‘endless forms’ of all living things strongly supports Darwin’s claims as to how these forms ‘have been, and are being, evolved’. For such a vast similarity, holding down to every cell of every living thing, would be expected given Darwin’s hypothesis that all these forms are descended from the same ‘simple beginnings’; but it would seem to have a probability approaching 0—a universal sheer coincidence, with trillions upon growing trillions of instances—on the negation of that hypothesis. So although we remain unable, say, to be clear as to how much of evolution is due to natural selection as opposed to the underlying dispositions of the materials on which selection works, we have evidently put some of Darwin’s ‘simple beginnings’ beyond reasonable doubt.

**5. Taking Freud in these terms**

We will start to consider Freud by comparing him with Darwin. Whereas Darwin’s discoveries relate to almost all features of living things, Freud’s are restricted to the thoughts and feelings of human beings, and the motives upon which we act. Still our own thoughts, feelings, and motives, and those of others, are of central importance in our lives, so that Freud’s discoveries also have great potential significance.

**(a) Disciplinary consequences of broad but weak prediction**

As an initial point it is worth noting that we can better understand the disagreements and differences in formulation that we find in Freudian and post-Freudian depth psychology by considering Darwin and the predictive weakness of his theory. It is relatively easy to frame hypotheses in both Darwinian biology and post-Freudian psychology, and the explanatory predictions these hypotheses generate are often, as Popper complained, too weak to provide clear grounds for choice between competitors. Despite the clearly scientific nature of evolutionary biology, this has the consequence that adherents of different hypotheses often engage in seemingly irresoluable disputes—about whether particular features of living things are to be understood as adaptations or ‘spandrels’; about lumping organisms together in the same species or splitting them into different species; about whether evolution is rapid, gradual, or sometimes one, sometimes the other; about whether genes should be described as ‘selfish’ and what this might mean; about the role of groups in natural selection; and so on and on. Hence the field has seemed constantly liable to fragment into opposing groups generated by such disputes; and one can find different competing groups of theorists, like varieties of the same species of bird, on almost every branch of the tree of life (see <http://tolweb.org/tree/>).[[4]](#endnote-4)

Post-Freudian depth psychology is, explicably, similar -- but worse. The reason is the same in both cases. Extant forms of explanation are too predictively weak to compel decision between competing hypotheses. Still, this is plainly consistent with describing the hypotheses of schools of depth psychology, like those of post-Darwinian evolutionary biology, as issuing from competing varieties of a single, viable, and vigorous species of explanation, generated by the work of the founder in question. Darwin’s successors show how even in biological science weakness in prediction can foster explanatory competition that obscures underlying theoretical similarity (Freud’s (1930b) “narcissism of small differences”—p. 305). In psychoanalysis this is amplified by insurmountable difficulties in communicating clinical data among investigators and groups.

The clinical data of depth psychology, like human thought and feeling generally, vary unpredictably from individual to individual, moment to moment, context to context, and therapy to therapy. This are no skeletons, fossils, or colour-coded representation of gene expression for everyone to examine publicly and come to agree about; videos and physiological monitoring catch only a fraction of what participants actually think and feel; and even for a single dream, as Freud’s writings illustrate, the associations and hypotheses required to understand the motives expressed in it are so lengthy, disconnected, and hard to scan, that they can only rarely serve as instruments of communication.

As a result psychoanalytic clinical data, even where well understood, remain impossible to compress or survey. Discussion often centres on clinical vignettes, which inevitably display only a minute fraction of the data on which hypotheses are actually based, and are naturally cast in the theoretical vocabularies that serve as marks of distinction for differing schools. In these circumstances cross-school discussion requires both translation of vocabulary and suspension of group loyalty—difficult matters even in more favourable evidential circumstances, as disputes among Darwinians indicate. In both cases deeper inspection makes clear that similarities in empirical content outweigh the differences that demarcate competing schools; but disputation remains liable to obscure theoretical claims tacitly shared by all.[[5]](#endnote-5)

The ease and rapidity with which different investigators can share data is an important factor in the collaboration and progress characteristic of science (see Hopkins, 1992, for further discussion.) In light of this we should not be surprised that Freud’s successors are less able to secure agreement among one another, and slower to do so, than Darwin’s. This is just what we should expect, given the nature of the data; and it would be expected even if, as I think, hypotheses cast in psychoanalytic terms are very often good explanations, as well as the best we have, of the vast range of data they cover.

The case is similar for the hostility and scepticism that psychoanalysis arouses. These are clearly comparable to now familiar forms of outrage at Darwinian claims that violate what was once regarded as common sense. Darwinian scientists, together with allied disciplines and scientific institutions generally, work continually to mitigate these reactions. They provide public rehearsals of data and explanation, such as we see in schools and museums, on websites like the tree of life mentioned above, and in many other place; and they combine these with prestige- and solidarity-building group celebrations like *Darwin 200*. In the case of Freud’s hypotheses, and despite their widespread diffusion, the relative incommunicability of data—even for hypotheses of great explanatory scope—undermines such attempts at education and mitigation of outrage.

(**b) Progress in Darwin and Freud**

We saw in Darwin how a theory that predicted weakly but very broadly could engender scienific progress, and in the process come to enjoy stronger confirmation than seemed possible at the outset. We find an analogous combination of weak but broad prediction in Freud. Even allowing for differences that have grown up among his successors, the mechanisms hypothesized by Freud have a strong overall claim, supported by very many instances of good explanation, to play a significant role in the understanding of the working of motive in individual psychology, dreaming, and mental disorder; and also in group psychology, and particularly in understanding the dispositions to group-on-group conflict that have punctuated our history, and now may put a stop to it. So if there is a Freudian analogue to the kind of progress that resulted from the work of Darwin, we should surely seek to understand and explore it.

This kind of progress requires that the broad weak predictions of the initial basic hypotheses be borne out later, but in further and perhaps very distinct disciplines that investigate the working of the causal mechanisms originally hypothesized. As the scanning experiment with which we began illustrates, such investigation is now under way for the neural mechanisms of human motivation. Many findings seem to be such as we might expect, given that the mechanisms operate in ways previously indicated by Freud and his successors.

**(c) Common sense and causal explanation in Freud.**

In the work of Freud like that of Darwin we find both beginnings in common sense, and a kind of progress that rapidly comes to contradict commonsense ideas. We can trace Freud’s step-by-step progress from common sense to radically different conclusions in works such as *The Interpretation of Dreams* (Freud, 1900a), and indeed even in the single specimen dream—the dream of Irma’s injection—with which he begins that book. Even Popper, when he finally studied Freud’s explanations there closely, wrote that:

[Freud’s theory of dreams] contains, beyond any reasonable doubt, a great discovery. I at least feel convinced that there is a world of the unconscious, and that Freud’s account of dreams given in his book are fundamentally correct, though no doubt incomplete (Popper, 1983, p, 164; cf. Grünbaum, 1989).[[6]](#endnote-6)

We saw above that Popper’s methodology does not readily explain his favourable judgement on Darwin, and the same, as Grunbaum has stressed, applies to this judgment on Freud’s account of dreams. So it may be worth applying the sketch with which we began, as this relates to accounts of Freud on dreams that have been given elsewhere.[[7]](#endnote-7)

**(c1) Desire, belief, and intentional action**

The commonsense concepts that Freud extends are the basic ones of desire and belief. These are related by one of the deepest generalizations of commonsense psychology, that which concerns the relation of desire and belief in successful intentional action. An example of such an action would be one in which a person desires to drink from a glass in front of her, and does so. For purposes of generalization we can represent this as:

A (the agent) desires that A drinks 🡪 A drinks.

where ‘🡪’ represents the causal working of the agent’s desire to drink in governing the motor activations via which she drinks, and thereby succeeds in satisfying her desire. This illustrates the way we describe desires to perform actions of particular kinds in terms of the kinds of actions that would satisfy those desires, and hence in terms of effects those desires would have if acted on.

This evolved conceptual and linguistic practice[[8]](#endnote-8) enables us to understanding the causal working of desires, beliefs, and other states of mind without explicit use of the concept of causality, and via our understanding of the sentences we use to describe them. So our practice yields a general causal and linguistic pattern that holds in all cases of successful intentional action, which, keeping our original in brackets, we can abbreviate using the schematic letter ‘P’.

A des P [e.g. I drink] 🡪 P [I drink]

In the example of drinking the agent’s desire would have operated via her belief that if she moved in certain ways she would drink, and this would have combined with her desire that she drink to produce a desire to move in the way she did to do so. Let us describe A’s belief as the belief that if she moves in the D ways she will drink, and abbreviate the sentence describing the belief by ‘Q’. Then we can represent the causal combining of her desire and belief by the so-called ‘practical syllogism’:

A des P and A bel if Q then P 🡪 A des Q

If we write this in another way:

A des P

A bel if Q then P

A des Q

we can see why people have spoken of a syllogism in this kind of case. When an agent forms a means-end desire in this way, the linguistic form of the sentences in terms of which we describe the process (taken from the bottom up) is that of *modus ponens.* This indicates the rationality of this kind of alteration of desire in light of belief. It shows that if we satisfy the desire for the means (des Q) and if our belief about the means-end connection (if Q then P) is true, then the satisfaction of the desire that is our end (des P) is logically guaranteed.

This guiding action-guiding role of belief in the satisfaction of desire is familiar. Equally important, however, is another role, which we encounter when we consider what happens after an agent has acted to satisfy a desire. In this case the agent receives perceptual feedback from her own action, so that she has what Freud called ‘the experience of satisfaction’. This perceptual experience pacifies the desire – inhibits it, or causes it to cease to operate. So the overall pattern, including in brackets the particular desire- action- perception- and belief-describing sentence with which we are concerned, is:

A des P [I drink] 🡪 P [I drink] 🡪 A exps, bels P [I drink]🡪 A des P [I drink] pacified.

This is one of the most basic patterns of commonsense psychological understanding. It registers the fact that experience and belief not only guide desire but also cause it to cease to operate. This is particularly important for understanding Freud.

**(c2) Wishfulfilment, projection, and simple dreams from sensory impingement.**

This emerges if we consider simple dreams. An example would be the dream of *drinking delicious cool water* that Freud often had after having eaten salty foods (Freud, 1900a). He would have this dream several times, before waking up thirsty and getting a drink. Many people have had such a dream: and even more, probably, its counterpart of dreaming the experience of a satisfying micturation, after repetitions of which one wakes with a full bladder.

Someone who has a dream of this kind characteristically understands it in terms of a causal pattern like that above. Thus someone who wakes up thirsty after a dream of drinking takes it that the thirst caused the dream, as someone who wakes up after a dream—or series of dreams—of micturation takes it that the cause of these dreams is the full bladder that they go on to relieve in reality. Such dreams seem clear examples of the causal pattern of Freudian wishfulfilment, that is, of an *imaginary* experience of satisfaction of some desire or wish, but *in the absence of real satisfaction*, and caused by the desire or wish itself.

This pattern is very similar to that of the working of desire in intentional action above, except that the causal role of the real satisfaction of the desire—as abbreviated by ‘🡪 P [I drink] 🡪’—is left out. So we have:

A des P [I drink] 🡪 A dream exps, bels P [I drink]🡪 A des P [I drink] pacified

or again:

A des P [I micturate] 🡪 A dream exps, bels P [I micturate]🡪 A des P [I micturate] pacified

These dreams thus consist in imaginary experiences of satisfaction. The imaginary experiences, in turn, seem to have two connected causal roles:

They (temporarily) pacify the nascent desires to drink or micturate that the dreamers experience and act on when they finally wake up; and at the same time

They mask (inhibit, suppress, repress) both the desire and the *veridical* internally caused sensory experience (of thirst or a full bladder) that causes the desires in question.

In this they apparently exemplify Freud’s (1900a) conception of dreams as ‘guardians of sleep’, and also, as Freud held, to serve in managing conflict among sources of motivation.

As accords with these general ideas we now have a range of connected grounds for holding that sleep and dreaming are important physiological and psychological processes, and such as would naturally be protected from interruption. Long-term sleep deprivation kills laboratory rats (Rechtschaffen & Bergmann, 1995) and is liable to cause paranoid hallucinations and delusions in human beings (Coren, 1998[[9]](#endnote-9)); and even mild short-term deprivation renders individuals more liable to false memory (Diekelmann, Landolt, Born, & Wagner, 2008). Conversely, sleep and dreaming apparently serve in the processing of both memory and emotion, consolidating new memories and reactivating and reconsolidating old ones at the same time as they knit up the raveled sleeve of care (Rasch and Born 2013 ‘The Active Systems Consolidation Hypothesis’). In this slow wave sleep (SWS) and rapid eve movement (REM) sleep appear to play complementary roles (Rasch and Born 2013, Cairney et al 2014).[[10]](#endnote-10) Concurrently, turning to the physiological level of description, they are hypothesized to reduce the metabolic load on the synapses that connect neural cells, thereby effecting synaptic homeostasis (Tononi & Cirelli, 2014), and to cleanse the brain of metabolic waste (Xie et al., 2013).

These processes, moreover, seem to be systematically related. Alan Hobson and Karl Friston (2012) have recently hypothesized that REM dreams, and the vivid hallucinatory conscious experiences and the powerful activations of emotion that they involve, have the particular function of *optimizing the models of the world via which the brains of dreaming creatures effect waking perception and action*. This process of optimization reduces the *complexity* of the neural models, rendering them simpler and better in their functions of representing sensory input as conscious experience of its causes. Since the brain’s models function like hypotheses that predict future experience, this process is comparable to that by which scientists revise theories to make them simpler and better at predicting the data they explain (See for example Sober & Forster, 1997). We should expect the nocturnal consolidation of memory to be part of such an optimizing process, and Hobson and Friston argue that the reduction of complexity in the model involves the reduction of synapses required for synaptic homeostasis. So the hypothesized processes of consolidation and optimization might themselves yield metabolic waste that sleep eliminates.

These hypotheses, and particularly those concerning the REM processing of emotionally aversive memories (Rasch and Born 2013, Cairney et al 2014), cohere with psychoanalytic accounts of the role of dreaming. In explaining the role of conflict in dreams Freud sometimes hypothesized that dreaming was prompted by a wish to sleep, which conflicted, say, with the wish to drink or to micturate. In light of the importance of sleep and dreaming, however, it seems unnecessary to assimilate sleep to intentional action in this way. The conflict may be between the nascent desires to act and physiological mechanisms that operate to preserve sleep and dreaming without the intervention of desire, as with the mechanisms that maintain breathing. In either case we can assume that such simple wishfulfilling dreams work as they seem to do, by masking sensory input and pacifying desires that might interrupt these vital processes.

A similar sleep- and dream-preserving function can also be seen in dreams caused by ongoing pain, such as the projective dream reported by the neuroscience blogger Neurocritic in discussing this topic:

Yesterday morning, I had a terrible nightmare in which my real life leg pain was projected onto someone else in an exceptionally gruesome way. I was driving along an unknown neighborhood street when suddenly a man…had fallen under my car and had both his legs amputated from being run over…The gravely injured man was still alive…I was absolutely horrified. All I could do is say "oh my god oh my god oh my god" over and over…It was an awful nightmare, and in the dream I was quite traumatized by the entire experience.

As Neurocritic observes, neuroscientists investigating the mechanisms by which the pain-sensing systems are altered in REM sleep take them to explain ‘why nociceptive stimuli can be either neglected or incorporated into dreams without awakening the subject.’ This again would accord with the Freudian sleep- and dream-guarding function, as well as the emotional processing, memory consolidation, and model optimization mentioned above.[[11]](#endnote-11) His own dream, however, illustrates the capacity of projection to cause nightmares that may interrupt these functions, as do the apparently unassimable and consolidation-resistant memories of those who suffer from PTSD. The Freudian notion of projection he uses in describing this dream is also a way of managing motivational conflict, and can be understood by contrast with the more familiar notion of identification.

Freud understood identification as “the assimilation of one ego to another” (Freud 1933a, p. 63), and took this as an important mechanism of learning and development. Projection, by contrast, effects the *differentiation* of one ego from another, and Freud conceived it as involving the imaginary re-location of some (often unwanted or self-condemned) aspect of the self as in the other, thereby creating an image of the self as lacking, and the other as having, whatever was projected. We see this very clearly in the dream above, in which pain of the kind the dreamer perceives in himself is represented as in another person – and in this case, with a response of potential depressive pain of the kind related to the Freudian superego. Such nightmare-like hallucinations are also seen in sleep-deprived individuals, and again in paranoid schizophrenia, suggesting that they have a common underlying physiological basis, and one related to the kind of conflict that projection works to mitigate.

The virtual reality that projection creates for a dreamer seems very far from wished-for, although it is certainly created by their own motivational systems and from within their own brains. Hence in post-Freudian psychoanalysis, it is commonly described in terms of the notion of *phantasy*—a more general form of experience- or belief-like mental activity that encompasses daydream and other forms of make-believe or fictitious experience as well as wishfulfilment. (Moreover, since the dreamer is so deeply identified with the person into whom his pain has been projected, the phantasy would be one of *projective identification*, as described by Melanie Klein, 1946/1975) This illustrates how later psychoanalytic concepts have grown out of Freud’s early notion of wishfulfilment, while retaining parts of the same basic logical and causal structure.

To see the working of Freudian and post-Freudian hypotheses in these instances it may help to represent things visually. So let us set out data and hypotheses in the simple format below. The data with which we are concerned come, on the one hand, from the dreamer’s free associations, and on the other from the manifest content of the dream. So we can tabulate them as follows:

|  |  |
| --- | --- |
| Data from associations | Data from dream |

Then we can put in the hypotheses that we take to explain, unify and (weakly) predict the data between the columns in which the data are specified, to make clearer how the hypotheses relate to them. This will give:

|  |  |  |
| --- | --- | --- |
| Data from associations | Hypothesis that explains, unifies, and predicts data | Data from dream |

Taking the simple examples so far, we have:

|  |  |
| --- | --- |
| Data from associations | Data from dream |
| Freud has eaten salty food, wakes up thirsty and with a desire to drink | Freud dreams he is drinking, quenching his thirst, satisfying his desire to drink |
| Agent has full bladder, wakes up desiring to micturate. | Agent dreams he is micturating, emptying his bladder, and satisfying his desire to micturate |
| Neurocritic has pain in his leg. | Neurocritic has nightmare about pain in another man’s legs. |

As this makes clear, the data have the kind of commonsense causal pattern we saw above (they are correlated in content as **P** to **P**, and also as desire to experience of satisfaction, or again as beginning to end of a process of projection, as illustrated below). These patterns in content seem inexplicable by mere chance. So as accords with Bayesian methodology[[12]](#endnote-12), the correlation seems to require a causal explanation:

|  |  |
| --- | --- |
| Data from associations | Data from dream |
| Agent desires that **P** [I drink] | Agent experiences satisfaction of desire that **P** [I drink] |
| Agent desires that **P** [I micturate] | Agent experiences satisfaction of desire that **P** [I micturate] |
| Agent suffers **P** [I have pain in my leg] | Agent experiences another suffering **P** [Another has pain in his legs] |

Using the notions of wishfulfilment and projection, we can explain these data as follows:

|  |  |  |
| --- | --- | --- |
| Data from associations | Hypothesis that explains, unifies, and predicts data. | Data from dream |
| Agent desires that **P** [I drink] | Agent’s mind/brain manages conflict between nocturnal arousal of motive and continuing sleeping and dreaming by dreamt wishfulfilling representation of satisfaction that pacifies (inhibits) activation of motives that might interrupt sleep and dreaming. | Agent experiences satisfaction of desire that **P** [I drink] |
| Agent desires that **P** [I micturate] | As above | Agent experiences satisfaction of desire that **P** [I micturate] |
| Agent suffers **P** [I have pain in my leg] | Agent’s mind/brain manages conflict between nascent perception of pain and continuing sleeping/dreaming by dreamt projection of pain into another | Agent experiences projection of **P** into another [Agent causes another to have pain in his legs] |

Here the explanations unify the data by representing them as the result of the management of nocturnal motivational conflict, and in a way that is clearly also predictive. For given the hypothesis that wishfulfilment and projection in dreams are means of resolving conflict of this kind, then we can see how entries form the first two columns tend to predict the third, and entries from second and third tend to retrodict the first. We can also apply the same mode of explication to Freud’s analysis of his dream of Irma’s injection. Taking even a few parts from this may help give some sense of the intuitive grounds Popper, as well as many others, have had for accepting Freud’s explanations as likewise confirmed by data from his associations and dream.

**(c3) Part of Freud’s dream of Irma’s injection**

This dream originated in a visit paid to Freud by his close friend and family doctor Otto (Freud, 1900a). He had recently visited the family of Freud’s patient Irma, and been called away to give someone an injection. When Freud asked about Irma Otto replied that she was ‘better, but not yet well’. As Freud describes in the preamble to his analysis, he was annoyed by Otto’s remark and sat down later that evening to write up Irma’s case history to show it to another friend, M, who was a leading figure in their circle, in order to justify himself. That night Freud had a dream, some parts of which are quoted below, in which Irma, having apparently sent him a message ahead of time, came to a gathering at his house and complained to him about her pains:

…I at once took [Irma] on one side, as though to answer her letter and to reproach her for not having accepted my ‘solution’ yet. I said to her: ‘If you still get pains, it is really only your fault.’ She replied: ‘If you only knew what pains I’ve got now in my throat and stomach and abdomen—its choking me’—I was alarmed…I thought to myself that after all I must be missing some organic trouble. I took her to the window and looked down her throat…I at once called in Dr. M., and he repeated the examination and confirmed it … M. said ‘There’s no doubt it is an infection ... the toxin will be eliminated. We were directly aware, too, of the origin of her infection. Not long before, when she was feeling unwell, my friend Otto had given her an injection of a preparation of propyl, propyls … propionic acid. … trimethylamin (and I saw before me the formula for this printed in heavy type) … One does not make injections of that sort so thoughtlessly … And probably the syringe had not been clean (Freud, 1900a, p. 107)

In light of his analysis Freud took this dream—and particularly the final part about Otto having given Irma an injection of trimethylamin with a dirty syringe—as a wishfulfilment. As he says:

The dream fulfilled certain wishes which were started in me by the events of the previous evening (the news given me by Otto and my writing out of the case history). The conclusion of the dream, that is to say, was that I was not responsible for the persistence of Irma’s pains, but that Otto was. Otto had in fact annoyed me by his remarks about Irma’s incomplete cure, and the dream gave me my revenge by throwing the reproach back on to him … I was not to blame for Irma’s pains, since she herself was to blame for them by refusing to accept my solution. I was not concerned with Irma’s pains, since they were of an organic nature and quite incurable by psychological treatment. Irma’s pains could be satisfactorily explained by her widowhood (cf. the trimethylamin) which I had no means of altering. Irma’s pains had been caused by Otto giving her an incautious injection of an unsuitable drug—a thing I should never have done (p. 143).

The associations and thoughts on which Freud bases this interpretation run to some 15 pages in the *Standard Edition* (Freud, 1900a, pp. 96-121) and many more pages would be required here to explain which his account should be regarded as cogent. Still we can flag some points as before:

|  |  |
| --- | --- |
| Data from associations | Data from dream |
| Freud wants not to be responsible for Irma's suffering. | Freud says to Irma 'If you still get pains, it is really only your fault.' |
| Freud wants not to be responsible for Irma's suffering. | Irma is suffering from an organic complaint, so Freud is not responsible for Irma’s suffering. |
| Freud is annoyed with Otto, for his remark implying that Freud was in some way at fault in his practice with Irma. | Otto is at fault in his practice with Irma. |
| Otto had given someone an injection while at Irma's, and Freud has been contemplating that his injections never cause infection. | Otto gave Irma an injection that caused an infection. |
| Freud desires to clear himself of responsibility for Irma's suffering. | Otto bears sole responsibility for Irma's suffering. |
| Freud was hoping that M's opinion of his treatment of Irma would clear him of responsibility. | M observes Otto's bad practice and recognises that Otto bears full responsibility for Irma's suffering. |
| Freud thought Otto’s remark thoughtless. | Otto's injection of Irma was thoughtless. |

Here again, although less precisely specifiable, we find a series of correlations in content among the data that seem to require explanation by a causal connection, and that also suggest the kind of explanatory hypothesis that would do so. So, combining the Freudian hypotheses we used for the simple cases above, we have:

|  |  |  |
| --- | --- | --- |
| Data from associations | Hypothesis that explains, unifies, and predicts data. As in the simple cases above Freud’s mind/brain manages conflict between the nocturnal arousal of motive and the processes of sleep and dreaming by wishfulfilment and/or projection | Data from dream |
| Freud wants not to be responsible for Irma's suffering. | Freud wishfully and/or projectively locates responsibility for Irma suffering in Irma. | Freud says to Irma 'If you still get pains, it is really only your fault. |
| Freud wants not to be responsible for Irma's suffering. | Freud wishfully/projectively represents Irma as suffering from something for which he is not responsible. | Irma is suffering from an organic complaint, for the treatment of which Freud is not responsible. |
| Freud is annoyed with Otto, for his remark implying that Freud was in some way at fault in his practice with Irma. | Freud wishfully/projectively represents the situation as the reverse of that he took to be implied by Otto, so that it is Otto, not Freud himself, who can be accused of fault connected with Irma's suffering. | Otto is at fault in his practice with Irma. |
| Otto had given someone an injection while at Irma's, and Freud has been contemplating that his injections never cause infection. | Freud uses elements from reality to wishfully/projectively represent the situation as one in which Otto, not Freud himself, should be accused of fault connected with Irma's suffering. | Otto gave Irma an injection that caused an infection. |
| Freud desires to clear himself of responsibility for Irma's suffering. | Freud wishfully/projectively represents the situation as one in which he has no responsibility for Irma's suffering. | Otto bears sole responsibility for Irma's suffering. |
| Freud was hoping that M's opinion of his treatment of Irma would clear him of responsibility. | Freud wishfully/projectively represents M as finding that Irma's suffering was Otto's fault. | M observes Otto's bad practice and recognises that Otto bears full responsibility for Irma's suffering. |
| Freud thought Otto's remark thoughtless. | Freud wishfully/projectively represents Otto as thoughtless. | Otto's injection of Irma was thoughtless. |

As this illustrates, Freud’s associations enable us to see this more complex dream as a mosaic of elements, each of which is comparable to the simple examples we took previously. As the use of ‘and/or’ indicates, although Freud’s data can be understood in terms of the concept of wishfulfilment that he originally used to explain them, they are in fact better understood in terms of an hypothesis (projection, or projective identification) that he did not originally use. This concept was to be used for understanding dreams later and mainly by other analysts. This clearly improves explanation, since the hypothesis of projection predicts—as wishfulfilment alone does not—the displacement of traits from Freud to Otto.

This also illustrates something about Freud’s data, and those recorded by other analysts. It is characteristically the case that clinical data explained by the hypotheses of a particular analyst at a particular time are better explained by hypotheses framed by other analysts later for the explanation of different data. This tends to disconfirm the most popular non-psychoanalytic explanation of the kind of apparently confirmatory relation between data and hypotheses illustrated above, namely that analyst’s data seem explained by their hypotheses only because the data are, in one way or another, produced in response to, or ‘contaminated by’, those hypotheses. Insofar as Freud’s data are better explained by hypotheses he did not have in mind, this criticism is disconfirmed.

We can see more of this if we consider a further and deeper layer of data, concerning Freud’s memories not from the day of the dream, but from events some way in the past. (On the understanding of dreams as consolidating memories these would be, not memories under first consolidation, but rather emotionally important memories from the past, aroused for reconsolidation with those of the day.) Freud’s associations took him to a series of his own medical failures and derelictions. Thus he recalled that he had heard a few days earlier that a patient to whom he had recommended the use of cocaine “had developed an extensive necrosis of the nasal mucous membrane” (Freud, 1900a, p. 111) and in connection with this that he “had been the first to recommend the use of cocaine, in 1885, and this recommendation had brought serious reproaches down on me. The misuse of that drug had hastened the death of a dear friend of mine.” (p. 111)

The ‘serious reproaches’ were the result, among other things, of Freud’s claiming that cocaine was not addictive, and this had also been his reason for recommending that his friend use it to withdraw from the morphine that we was using (and becoming addicted to) for the control of incurable nerve pain. But his friend “had at once given himself cocaine injections”, and had ultimately died as a result. Likewise Freud recalled “a tragic event in my practice. I had on one occasion produced a severe toxic state in a woman patient by prescribing what was at that time regarded as a harmless remedy...My patient, who succumbed to the poison, had the same name as my eldest daughter” (p. 111). As this prompted him to reflect, “It seemed as if I had been collecting all the occasions I could bring up against myself as evidence of lack of medical conscientiousness.” This had apparently been an unconscious response to Otto’s remark, or to his own activity in writing up Irma’s case history afterwards.

This enables us to see more clearly that a main theme of Freud’s dream (and tacitly of his analysis) was guilt and potential shame about these evidences of lack of medical conscientiousness. The medical circle that materializes in this dream and assesses Freud’s and Otto’s treatment of Irma was one of Jewish physicians in Vienna, all of whom were aware that ‘doctrinal considerations’ might impede their professional lives, and hence also aware of the importance of their reputation for medical competence and conscientiousness. Freud also makes the importance of his own self-reproaches clear in his associations to his final reproach to Otto, saying:

*One does not make injections of that kind so thoughtlessly*…this sentence in the dream reminded me once more of my dead friend who had so hastily resorted to cocaine injections…I had never contemplated the drug being given by injection. I noticed too that in accusing Otto of thoughtlessness in handling chemical substances I was once more touching upon the story of the unfortunate Mathilde, which gave grounds for the same accusation against myself… (Freud, 1900a, p. 106).

*And probably the syringe had not been clean*. This was yet another accusation against Otto… I was proud of the fact that in two years I had not caused a single infiltration; I took constant pains to be sure that the syringe was clean. In short, I was conscientious. The phlebitis brought me back once more to my wife…and now three similar situations came to my recollection involving my wife, Irma and the dead Mathilde… (p 107).

From these associations we can again see the importance Freud attached to these two deaths, for both of which he felt personally responsible, and both of which were the result of the misuse of toxic substances in injection. Taking these associations into account, we have:

|  |  |
| --- | --- |
| Data from associations | Data from dream |
| Freud’s advocacy of the medical use of cocaine brought ‘serious reproaches down on me’ | Otto thoughtlessly misuses trimethylamin. |
| Freud feels guilt because he accidentally killed a patient by giving her toxic injections. | Otto gives Irma a toxic injection of trimethylamin. |
| Freud feels guilt because he advised a friend to take cocaine, and his friend later died from cocaine injections. | Freud reproaches Otto before M and their other medical colleagues, saying that one does not make injections of that kind so thoughtlessly. |
| Freud was proud that he is careful to give injections that do not cause infection. | Freud reproaches Otto before M and their other medical colleagues, saying that Otto’s syringe had probably not been clean. |

And again:

|  |  |  |
| --- | --- | --- |
| Data from associations | Hypothesis the explains, unifies, and predicts data: Freud manages conflicts arising from his own guilt about thoughtless use of toxic substances and injections by wishfully/projectively representing Otto as opposed to himself as deserving such blame, and himself as censuring Otto accordingly. | Data from dream |
| Freud’s advocacy of the medical use of cocaine brought ‘serious reproaches down on me’ | Freud wishfully/projectively represents Otto as misusing potentially toxic substances. | Otto misuses trimethylamin. |
| Freud feels guilt because he accidentally killed a patient by giving her toxic injections. | Freud wishfully/projectively represents Otto as opposed to himself as giving a thoughtless toxic injection. | Otto gives Irma a toxic injection of trimethylamin. |
| Freud feels guilt because he advised a friend to take cocaine, and his friend later died from cocaine injections. | Freud wishfully/projectively represents Otto rather than himself as liable to reproach for damaging injections. | Freud reproaches Otto before M and their other medical colleagues, saying that one does not make injections of that kind so thoughtlessly. |
| Freud was proud that he is careful to give injections that do not cause infection. | Freud wishfully/projectively represents Otto as opposed to himself as giving injections of the kind that cause infection. | Freud reproaches Otto before M and their other medical colleagues, saying that Otto’s syringe had probably not been clean. |

In this we can see the role of guilt and shame more clearly, and with this the additional significance of the projection into Otto that enables Freud to shame Otto before their medical circle for the kind of ‘incautious’ injections and use of toxic substances for which he seems personally to have suffered guilt and shame himself. And finally it may be worth noting that trimethylamin, and Freud’s linking of it with both cocaine and sexuality in his associations, has a further significance, which Freud reasonably enough chose not to disclose. Years after the publication of Freud’s book Karl Abraham wrote to him about his “suspicion of syphilitic infection in the patient: the spot in her mouth…the injection of trimethylamin which has been carelessly given, the dirty syringe (!!)…Is not this the organic illness for which you cannot be made responsible…?” (in Abraham, Abraham, & Freud, 1965, p. 18). Freud replied: “Syphilis is not the subject matter…the three women are my daughters’ three godmothers, and I have them all! There would be one simple therapy for widowhood, of course. All sorts of intimate things naturally.” (in Abraham, Abraham, & Freud, 1965, p. 20).

If we treat what Freud says here as further data, we have:

|  |  |
| --- | --- |
| Data from associations | Data from dream |
| Freud had wished to have the widows in the dream. | Otto gives the widow Irma an injection of trimethylamin with a dirty syringe. |
| ‘There would be one simple therapy for widowhood.’ | As above |
| Trimethylamin is a sexual substance. | As above |

And again:

|  |  |  |
| --- | --- | --- |
| Data from associations | Data that explains, unifies, and predicts data. | Data from dream |
| Freud wished to have the widows in the dream. | Freud manages conflict about his own guilt concerning sexual feelings towards Irma by wishfully/projectively but *symbolically* representing Otto as sexually invasive towards Irma. | Otto gives the widow Irma an injection of trimethylamin with a dirty syringe. |
| ‘There would be one simple therapy for widowhood.’ | As above | As above |
| Trimethylamin is a sexual substance. | As above | As above |

This takes us in the direction of sexual symbolism and the metaphor of the mind as a container, as noted above, and adds to our sense of the complex but pervasive sense of the emotion of guilt, and the range of projection, depicted in the dream. Taking this into account, moreover, enables us to see—and more or less automatically to participate in—the way the understanding of motive in dreams complements the understanding of action in waking life.

We have seen that Freud found Otto’s remark annoying, and sat down to write up Irma’s case history to show to M to discuss his treatment of her. In this his feelings and actions were those of a normal man and responsible physician. But we may wonder why, exactly, Freud found Otto’s remark annoying, and why he responded to it in such a way (‘…to justify myself…’)? Prior to his analysis of the dream neither he nor we (his readers) had any particular understanding of this response. After his analysis, I think, we take ourselves to understand better. We think (hypothesize) that both his annoyance and his going over the case with the aim of justifying himself were caused by (non-conscious) stirrings of the guilt and desire to avoid shame that his analysis the next day revealed so clearly.

This is an hypothesis that readers will naturally entertain and try to test further as they read further, both in this dream and in Freud’s book.[[13]](#endnote-13) This kind of connection between the understanding of motive gained by the interpretation of dreams and that gained by the interpretation of action is an important part of the inferential engine of Freud’s radical but step-by-step extension of commonsense psychology; and we see these two factors at work in the way Freud’s analysis of his dream alters our sense of why he felt and acted as he did on the day before he had it.

Also in this we can see the importance of free association, in enabling a person who practices it to gain access to causes of his thoughts and feelings of which he would not otherwise become aware. Consider Freud’s associations to the patient he had accidentally killed:

My patient—who succumbed to the poison—had the same name as my eldest daughter. It had never occurred to me before, but it struck me now almost like an act of retribution on the part of destiny. It was as though the replacement of one person by another was to be continued in another sense: this Mathilde for that Mathilde, an eye for an eye and a tooth for a tooth (Freud, 1900a, p. 111-2)

That is: not only did Freud find in the course of his associations that a part of himself:

had been collecting all the occasions which I could bring up against myself as evidence of lack of medical conscientiousness (p. 112);

but also this part of himself seemed somehow to menace him with terrible retribution—eye for eye and tooth for tooth, this Mathilde for that Mathilde—in the form of the death of his own daughter.[[14]](#endnote-14)

This is a kind of deep but significant feeling that becomes available in free association, but rarely emerges in other frames of mind. In the context of Freud’s thinking we can see that this process is particularly revealing, since we could scarcely ask for a clearer example of what Freud was later to call the harsh and moralistic superego or ego-ideal (e.g., Freud, 1923b, 1933a). Freud was later to study the working of this faculty in severe depression: “We see how [in severely depressed individuals] one part of the ego [*das Ich*] sets itself over against the other, judges it critically, and, as it were, takes it as its object’, so that they direct ferocious moralistic anger against themselves, regarding themselves as ‘worthless’ and ‘morally despicable’” (Freud, 1917e[1915], pp. 246-247).

A characteristic example is provided by Elyn Saks’ recent account of her own breakdown into depression and schizophrenia, which began with her attacking herself by saying:

I am not sick. I’m just a bad, defective, and evil person. Maybe if I would talk less I wouldn’t spread my evil around’ (p. 58).

As time passed her self-reproaches became more constant, violent, and repetitive:

I am a piece of shit and I deserve to die. I am a piece of shit and I deserve to die. I am a piece of shit and I deserve to die (p. 58).

When medication temporarily lessened her depression she told her doctor *that she felt less angry*, and remarked on “how much rage I had felt, directed mostly at myself…” (Saks, 2008, p. 69).

Freud’s associations indicate that a similar but unconscious process of aggressive and menacing guilt had been at work in the formation of his own dream, and we have seen that he dealt with it by projecting the things of the kind he was guilty about into Otto. By the end of his dream Freud could take the role of superego to Otto’s ego, and condemn Otto as a giver of the kind of thoughtless (‘incautious’) toxic injections that he regretted in his own case.

This is partly comparable to the way Neurocritic projected his own pain into another in the simple dream we discussed above, and Freud was later to find that such guilt- or pain-relieving projection was one of the main ways by which people seek to mitigate internal conflict involving guilt or shame. In particular he was to find that:

1. Many individuals deal with internal conflict that might cause guilt or shame by projecting what they unconsciously feel to be bad parts of themselves into others. In this way they can identify with their own moralistic superegos, by condemning or attacking what they feel to be bad aspects or parts of themselves as these appear in other persons.

This kind of projection-driven moralistic condemnation is common enough to be the target of the biblical imperative not to condemn the mote in another’s eye while ignoring the beam in one’s own; and it serves not only for the maintenance of individual self-esteem, as we see in Freud’s dream, but also in fostering group-on-group aggression. Thus consider two fairly recent experimental studies of homophobia (Adams, Wright, & Lohr, 1996; Bernat, Calhoun, Adams, & Zeichner, 2001). In both the experimental subjects were men who identified themselves as heterosexual, and were divided into homophobic and non-homophobic subgroups. In the first experiment both groups were shown homosexual pornography while their erectile responses were monitored. The most homophobic men were also the most likely to be aroused by watching homosexual acts, and to deny this arousal despite ongoing physiological measurement. This would be consilient with the idea that these men were condemning things in others that they unconsciously condemned in themselves, as Freud was doing in his dream.

In the second experiment the groups administered shocks to a (fictitious) opponent, as part of what they took to be a competitive examination of reaction times to explicit sexual material—which again was a male-on-male pornography. The homophobic group reported more negative affect, anger, and hostility while watching the video; and in administering shocks they were significantly more aggressive towards opponents they took to be homosexual as opposed to heterosexual. This would fit with the idea that members of gay-bashing or other sexually prejudiced groups, who regard their activities as validating their masculinity, are maintaining idealized images of themselves by attacking what they unconsciously register as their own ‘bad’ characteristics, as these have been located in others. Something similar seems to hold in many other cases—of sexual prejudice, or dehumanization more generally—in which the same mechanisms of (identificatory) ingroup idealization and (projective) outgroup contempt and denigration seem to operate.[[15]](#endnote-15)

Taking Freud’s dream in this light we see that his analysis here also looks forward to the work in which he founded psychoanalytic group psychology. As he was later to argue, human groups often establish ingroup moral cohesion and co-operation for outgroup conflict by identifying with idealized leaders or creeds, and thereby locating deviation from these in members of outgroups, against whom moralistic aggression becomes morally mandatory. We can see this pretty clearly in the idealization of Hitler and antisemitism fostered by the Nazi party, in accord with which both Roosevelt and the Jews were represented as parties to a Jewish conspiracy of world domination, for which the only remedy was their extermination. So Freud’s projection into Otto also exemplifies the mechanism that establishes the pattern of ‘good us (ingroup) against bad them (outgroup)’ that underpins much human group conflict (for a fuller discussion of the working of identification and projection in group psychology see Hopkins, 2003, 2004, 2013).

Freud also explained later how such projection can operate in severe mental illness:

1. Schizophrenic individuals often project their superego/ego-ideal itself, thereby creating a virtual world of moralistically threatening (‘eye for an eye…tooth for a tooth’) presences. As Freud says “the voices, as well as the undefined multitude [of potentially critical psychological presences embodied in the superego/ego-ideal] are brought into the foreground again by the disease” so that the sufferer’s superego/ego-ideal “confronts him in a regressive form as a hostile influence from without.” (Freud, 1914c, p. 96).

We can see something closely comparable in Saks’ (2008) account, in which lost was her sense that *she* was engaged in self-reproach, and that *her own* thoughts were involved. Rather she came to feel that she was “receiving commands” from “shapeless powerful beings that controlled me with thoughts (not voices) that had been placed in my head.” (p. 58 84 check). Thus she was commanded: “Walk through the tunnels and repent. Now lie down and don’t move. You are evil.” (p. 61 69 Check) And as was appropriate to her evil, she also received commands to injure herself, which she obeyed by burning herself with cigarette lighters, electric heaters, or boiling water.[[16]](#endnote-16) Likewise Freud was later to hold that:

1. Individuals suffering from mania are identifying or ‘fusing’ with their own superego/ego-ideal. While ‘the misery of the melancholic’ results from a ‘sharp conflict’ between the ego and the superego/ego-ideal, in mania the ego and the ego-ideal have fused together, so the individual is “disturbed by no self-criticism”—as Freud was no longer disturbed, at the end of his dream (Freud, 1921, p. 132).

Freud’s early formulations of these ideas have been improved by his successors in many ways, but the notion of projection that he first detailed from the inside in the Irma dream remains central to all accounts. Earlier I stressed that it is difficult to represent psychoanalytic clinical data in ways that are effective for scientific communication; and this is particularly well illustrated by the response of philosophers of science to the data and hypotheses we have been discussing here. As we saw above, Popper regarded Freud’s analyses of individual dreams as cogent, and as constituting ‘a great discovery’. Adolph Grünbaum and Clark Glymour also regard it as cogent, with Grünbaum (1984) saying that “this is a case in which commonsense psychology regards a dream as patently wishfulfilling” (p. 221) and Glymour 1983) that “the interpretation offered is enormously plausible” (p. 63). But in contrast to Popper, neither sees Freud’s use of free association or his analysis of this dream as containing any kind of discovery at all.

Glymour (1983) opines that “the Irma dream is one whose interpretation can be read almost on its face, and the elaborate “analysis” Freud offers us contributes virtually nothing” (p 64); and Grünbaum (1984) says that although “the aggressive conscious wishes that Freud had on the day before the dream were then patently realized in its manifest content, free association played *no excavating role* in his recall of these wishes after the dream, since he had been avowedly conscious of them in the day before” (p. 222). Despite the intelligence, expertise, and authority of their authors, these comments are clearly mistaken.[[17]](#endnote-17) As we have seen, Freud’s explicit references in his dream to toxins, injections, and trimethylamin, and particularly his closing reproaches to Otto, cannot be understood without considering his associations to his own killing of a patient by toxic injections, to his role in the death of a friend from cocaine injections, nor to the reproaches and guilt he suffered in relation to them.

Although these things figure prominently in Freud’s associations *after the dream*, he was by no means ‘avowedly conscious’ of them on the day before. Quite the opposite: Freud was then avowedly conscious only of “a disagreeable impression” which “was not clear to me” (1900a, p. 106 ); and he says that it was only after analyzing the dream that he was able to put “the obscure disagreeable impression I had had when Otto brought me the news of Irma’s condition” retrospectively into words (p. 120). And whatever Freud’s conscious reflections after the dream, there is no reason to suppose that they involved trimethylamin, or the incoherent idea that it would somehow set things right if Otto were to be shown to have made Irma very ill by giving her a toxic injection that Freud could triumphantly diagnose in front of M and the other members of their medical circle. On these topics his associations—beginning with his noting that his reproaching Irma for not having accepted his ‘solution’ indicated that he was ‘especially anxious’ not to be blamed for her condition—clearly played an excavating role, and one that went further than Freud could then gauge.

Grünbaum and Glymour seem to me not to have understood many aspects of Freud’s analysis, let alone the way it served not only as a specimen of his work at the time but as one of his first steps in the direction of many of his later discoveries. They might well disagree—after all these are matters of interpretation. But if Grünbaum were to have accepted the cogency of Freud’s analysis while failing to appreciate the many discoveries it contains, it would be expected that he would likewise not appreciate the role of such analyses in extending commonsense psychology generally. Such disagreements therefore also underline the importance of Grünbaum’s own argument, that to carry conviction Freudian clinical claims require to be linked to fields of enquiry that are less dependent on interpretation. So let us turn to these.

**6. Consilience: psychoanalysis, attachment, and neuroscience.**

**(a) Attachment**

The process of attachment—the forming of basic emotional bonds as between infants and their mothers and others who care for them—is particularly relevant for psychoanalysis, and also a bridge between psychoanalysis, experimental developmental psychology from infancy, and neuroscience.[[18]](#endnote-18) The founder of modern attachment research, John Bowlby, was trained in the British object-relations school of Melanie Klein, one of the pioneers of the psychoanalysis of children, and had been supervised by Klein herself. But he disagreed sharply with Klein on the role of events in the first year of life.

Klein had extended Freud’s thinking about “the earliest parental imagos” (Freud, 1933a, p. 64), which they both thought constitutive of the superego/ego-ideal, into an account of infantile phantasy in the first months of life. In retrospect we can see this account – in accord with which the infant naturally imagines that its good experiences, beginning with feeding at the breast, are caused by a very good figure or figures, whom it seeks to incorporate and identify itself with, but that its bad experiences are caused by a very bad figure or figures, from whom it seeks to dissociate itself, and which is the object of its projections – as a specification of the operation of the innate conceptual equipment in terms of which the infant initially attempts to make sense of postnatal experience. Taken in this light, the Kleinian notion of infantile phantasy also coheres with the group psychology of *good us* as opposed to *bad them*, as sustained by identification with good objects and projective dissociation from supposedly bad objects that we considered in connection with Freud’s dream above.

Bowlby, however, saw Klein’s emphasis on phantasy not as specifying innate mechanisms by which the infant made sense of its early postnatal experience, but rather as indicating a neglect of the infant’s actual and veridical experience of parenting, both in infancy and later childhood, which he had begun to study by empirical means. This criticism was also made from other analysts, as well as by empirical developmental psychologists of the time.

To render the issues involved more testable, Bowlby recast some of Klein’s hypotheses about the ‘internal objects’ of infantile phantasy as claims about the infant’s ‘internal working models’ of itself in relation to the mother (or other carers) to which the infant became attached. As he had intended, this facilitated the reformulation of psychoanalytic hypotheses in alternative theoretical vocabularies, and rendered his and Klein’s conflicting claims amenable to more empirical investigation. (And as we will see later, the notion of an internal model of the things we experience, including our own bodies and those of others, has become central for neuroscience generally).[[19]](#endnote-19)

Bowlby’s colleague Mary Ainsworth devised an empirical procedure, the ‘strange situation’, that proved capable of assigning infants from about 12 months (shortly before the onset of speech) to a set of different but statistically reliable categories of emotional relationship. This was a striking and seminal intellectual advance, and was to render attachment theory capable of many kinds of empirical investigation. But it also rapidly brought Ainsworth’s and Bowlby’s perspective closer to Klein’s, since it indicated that infants’ internal models had already developed so far as to attain a life-influencing form of stability by 12 months.

Such a role for the period prior to 12 months was what Klein had emphasized in the work with which Bowlby had disagreed; and such rapid postnatal development might be thought to presuppose an unlearned framework for the understanding of emotional relationships such as

Klein had described. And Klein had also described the effects of parenting in this early period in terms similar to those Ainsworth and others were to use.

In setting out her hypotheses about what she called the paranoid-schizoid and depressive positions of infancy in 1952 (Klein, 1952/1975), Klein had emphasized her agreement with the conclusions of Margaret Ribble’s observational (and EEG) studies of attachment in infancy, published in 1944. She had stressed that “[m]uch of the quality and the cohesiveness of a child’s personality depends upon an emotional attachment to the mother” because “the infant is, by its very incompleteness of brain and nervous system, continuously in potential danger of functional disorganization.” This meant that there was particular danger for the infant in “the sudden separation from the mother who either intuitively or knowingly must sustain this functional balance”. Also the delicacy of the balance entailed that “[a]ctual neglect or lack of love may be equally disasterous” so that “irregularities in the personal care and handling of the baby, such as too little care, too little handling of the baby” can “permanently alter the organic and psychic development” (pp. 88f).[[20]](#endnote-20)

The idea was not, of course, that such alterations determined future development; rather only that they might contribute to its course, and in ways that Ribble, and later Bowlby, Ainsworth, and their colleagues, set out to measure. While emphasizing these effects of parenting Klein also insisted that they were mediated by imagination or phantasy on the part of the infant, particularly concerning ‘the earliest parental imagos’ whose role in shaping postnatal experience she had attempted to describe. The ‘early imagos’ thus became the targets of Bowlby and Ainsworth’s investigations as well, and with a growing awareness that there was no inconsistency between Klein’s claims about early unlearned phantasy and Ainsworth’s empirical discoveries about the formative role of experience in the first year.

**(b) Embodiment and identity**

Klein’s hypotheses about prior development, moreover, turned on a particular conceptual change, the importance of which all developmental psychologists were starting to acknowledge. This was the infant’s coming to regard the mother (and by extension other persons and itself) as ‘whole objects’—that is, as distinct embodied individuals who maintained their identity in space and time. This same conception, as applied to the numerical identity of everyday material objects, was also a main focus of the researches of Jean Piaget, one of the leading cognitive psychologists of the time. Piaget did not investigate the concept of an object as it applied to the infant’s mother, but rather to non-living objects that could be readily manipulated and used in his informal but replicable experiments; but these indicated that ability to use the concept progressed with experience in stages from early infancy onwards.

Klein held that the infant’s coming to grasp the numerical identity of the mother was particularly important for infantile emotional and mental life, since it went with the infant’s coming to think and feel that both its mother and itself were single, unique, and enduring beings. This required the baby to distinguish more clearly between its fleeting internal subjective experiences and the lasting external objective things, including itself and mother, that these experiences represented. Also it entailed that infant and mother endured separations from one another that might be sources of pain, particularly to the infant, and that while they were separated the infant might feel that it risked losing a relationship that was both indispensible and irreplaceable.

In this case, as Klein thought, the infant might seek to minimize pain by denying distress at separation, and also by denying dependence on the mother and/or her irreplaceability and significance in its life. But also the pain of separation, if acknowledged with a growing degree of realism, could evoke anxious but empathic concern for the mother; and Klein regarded this as the root of later sympathy, empathy and care. Ainsworth’s colleague Sylvia Bell began to espouse similar ideas in 1970, via notions of object- and person-permanence derived from the work of Piaget (Bell. 1970).

Other psychoanalytic schools also developed analogous views, cast in terms of a ‘pre-objectual’ or ‘pre-ambivalent’ stage of infantile mental life, before the notion of the mother as a single enduring object took hold (see Kumin, 1996). So over time, and despite other disagreements, psychoanalytic and empirical research, including that of cognitive psychologists influenced by Piaget, had started to focus on the infant’s conception of the identity of persons *as embodied*, and on the emotional consequences that this might have.

Research would subsequently indicate that the infant’s understanding of its mother as a single enduring object of emotion unfolded on a distinct development track from its understanding of objects that were merely physical. The process began as the infant’s emotions were focused on the mother in nursing and care, and became increasingly interactive and social, taking the form of playful, rhythmic, and turn-taking exchanges of expression of feeling (‘prroconversations’) by 2 months. At 4 months, however, a baby made angry by an experimenter’s impeding hand would direct anger at the hand itself, as if still conceiving the world (including the mother, her breast, eyes, face, etc.) as consisting of anatomically incomplete part-objects, as psychoanalytic accounts had held (on the regulation of anger see Campos et al. (1983) and Stenberg, Campos, and Emde (1983).

Some time around the 5th month babies seemed to start to think of their mothers as single, unique, and lasting, as Klein had hypothesized;[[21]](#endnote-21) and as we shall see, this period seems particularly important in a number of ways. Following it, by seven months babies direct anger at an offender’s face, and can be seen to regulate it on the basis of their experience of the person concerned. A baby is especially angry if its mother annoys it *after* a stranger has done so, as if it expects comfort in such a situation and this expectation has been betrayed. And around this time, often by 8 months, a baby starts angrily protesting mother’s leaving its presence, and becomes fearful of strangers, although it had readily tolerated these things before—the difference, it seems, being made by the baby’s increasing understanding of the nature and possible consequences of separation, and of its relation with the mother as uniquely valuable and important.

These protests and fears seem to lessen towards 10 months, with the observable development of intersubjectivity. The infant becomes aware not only that it and mother are aware of one another—such mutual awareness seems already a part of the two-month ‘protoconversations’—but also that each is aware of the other as attending to some third thing or person. This mutual awareness is naturally used to exchange information about these other things, so that, for example, the infant may come to welcome or to fear petting a dog, touching a snake, or ringing a bell, depending on the attitude mother communicates. This seems to be the point of intersection of the infant’s growing conception of persons who feel, think, and communicate on the one hand, and inanimate objects on the other. And while the latter leads to our later conceptualization of the realm of merely physical objects, and hence to the cultural development of the physical sciences, the former leads to our very different later ways of thinking of the realm of persons (including ourselves) and their minds (for recent discussion see Trevarthen (2009) and Ammaniti and Trentini (2009)).

**(c) The strange situation and infantile attachment**

The consolidation that prompted focus on the first year apparently concerned the infants’ emotional bonds with both parents and other carers; and Ainsworth’s ‘strange situation’ can be used to assess and classify any of these. Since the theoretical claims the procedure was initially designed to address turned mainly of the infant’s internal model of itself in relation to its mother, we will take things in these terms, while bearing in mind that such research investigates the role of fathers and other carers (e.g., in adoptive and/or gay couples) as well.

The strange situation consists of eight episodes, the first lasting only thirty seconds; the rest were originally set for 3 minutes, but with the proviso that they would be shortened in response to infants’ distress, which means that in practice the upsetting episodes (3) and (4) and (6) and (7) often last 30 seconds or less. In (1) mother and infant settle in an unfamiliar but comfortable situation, in which, in (2) the mother is able to sit while the infant can explore the new place and play with toys that have been provided there. The real work of the procedure begins with episode (3), in which, when the mother is settled and the infant (hopefully) at play, a stranger enters, thus activating the infant’s recently mastered fear of strangers, and attempts to play with the infant (e.g., by offering a toy). Then in (4) the mother leaves the infant alone with the stranger, so triggering the infant’s (usually angry) protests, and its recently mastered distress at separation from her, as well.

She comes back again in (5), so giving the infant an opportunity to relieve the anger and distress related to her going away, and also the fear caused by the stranger, and with this to facilitate a return to exploration and play. But after three minutes, in (6), she leaves the infant entirely alone and then (and as if this was not already bad enough) in (7) the stranger enters and again attempts to play. Thus in (6) and (7) the infant’s distress at separation and its fear of strangers are activated still more strongly, together with its anger at the mother for having left it in such a situation, and despite protests, yet again. (These phases, like (4) and (6), are shortened if they prove too distressing for the infant.) In (8), the final reunion, the mother returns, with the opportunity again to relieve separation distress, anger, and fear, and to enable the infant to return to exploration and play.

Classification turns on how the infant copes with all this, and particularly on how it resolves conflict between the ‘negative’ and ‘positive’ emotions activated by the procedure. The negative emotions include anger at the mother—itself caused by her ignoring protest on leaving, and inflicting separation distress and fear of strangers in doing so—and the positive emotions include those roused by the mother’s coming back, receiving comfort from her, and returning to exploration and play. Hence the classifications over all—as shown in the table below—relate to conflicts between feelings and emotions related to maternal care, exploration, and play on the one hand, and anger, distress at separation, and fear on the other. Roughly, the infants classed as secure at 12 months show less conflict among these emotions, and resolve these conflicts more readily, than those who are classed as insecure, that is, as ambivalent/resistant, avoidant, or disorganized.

As also indicated in the table, this last classification turns on signs of conflict too severe for the infant to resolve—conflict that renders coherent feeling and behavior impossible. Infants classed as disorganized at 12 month seem to manage a fully organized resolution of their emotional conflicts only by 3; and the resolution often takes the form of a permanent predisposition to *coerce* and *control* what they seem to regard as perpetually untrustworthy objects of emotion. This they often achieve by violent means, but also, perhaps as determined by a balance of concern and fear, by forms of helpfulness that are also coercive and intrusive (For more on insecure and disorganized attachment and their later consequences see Howe (2011), particularly Chapters 12 and 13; for disorganized attachment in particular see Solomon and George (1999) and Lyons-Ruth and Jacobovitz (2008)).

**(d) Correlation between infant and adult measures of attachment: the strange situation and the adult attachment interview**

The strange situation has since been correlated with a range of other procedures to measure attachment in childhood, adolescence, and adulthood (see Howe (2011, pp 50ff), Hesse (2000, 2008), Crowell, Fraley and Shaver (2008) and Magai (2008)). The longest-established of these is the Adult Attachment interview, which consists of a series of questions designed to elicit interviewees’ current thoughts, feelings, and other states of mind with regard to their attachment relations as children. Thus the interviewer asks the interviewee ‘to describe your relationship with your parents as a young child, starting as far back as you can remember’; and again asks ‘Could you give me five adjectives to describe your relations with your mother (father) during childhood? I’ll write them down and when we have all five I’ll ask what memories led you to choose each one.’[[22]](#endnote-22) Answers to these questions support assignment to four adult categories which are closely comparable to the infant categories determined by the strange situation.

These comparisons have now been made over three generations of parents, and show impressive continuities between infant and adult forms. Some of these appear in the table below, taken from the more fuller accounts in Cassidy and Shaver (2000, 2008)[[23]](#endnote-23)

|  |  |
| --- | --- |
| **Infant’s attachment-related behavior, as classified during the Strange Situation procedure** | **Adult states of mind with respect to attachment, as measured by discussion in the Adult Attachment Interview** |
| **Secure** | **Classifications** |
| **Secure**  In pre-separation episodes explores room and toys with interest, with occasional returns to, or checks with, parent. Shows signs of missing parent during separation, often crying by second separation. Greets parent actively on return, often initiating physical contact. Usually maintains contact after second reunion but then settles and returns to play. | **Secure/autonomous**  Coherent collaborative discourse about attachment with ready flexibility of attention. Avows missing, needing, and depending on others. Explicit or implicit forgiveness of or compassion towards parents. Accepts imperfections in the self, ruefully describes own untoward flawed behavior despite conscious efforts to the contrary. Sense of balance, proportion, or humor. |
| **Insecure** | **Classifications** |
| **Avoidant**  Little flexibility of attention: focuses on toys or environment and away from parent, whether present, departing, or returning. Does not cry on separation, response to parent appears unemotional, but actively avoids and ignores parent on reunion (i.e. by moving away, stiffening, turning away, or leaning out of arms when picked up). | **Dismissing**  Discourse not coherent. Attention inflexibly focused away from attachment history and its implications. Makes positive or idealizing generalizations about attachment history (‘excellent, very normal mother’) that are unsupported or actively contradicted by episodes actually remembered. Describes self as strong, independent, normal, with little or no acknowledgement of hurt, distress, or feelings of needing or depending on others. Repeated insistence on absence of memory or brief contemptuous derogation of, or active contemptuous refusal to discuss, a particular event or figure, so responses often excessively short. |
| **Resistant or Ambivalent**  Little flexibility of attention, may be wary or distressed even prior to separation, and focuses on mother and preoccupied with her throughout. Upset by separation, fails to settle and take comfort in parent on reunion, usually focuses on parent and cries. May alternate bids for contact with signs of angry rejection or tantrums, or efforts may be weak. Does not explore during separation or after reunion. | **Preoccupied**  Not coherent. Either passive or angry preoccupation with experience of being parented. Responses persistently and inflexibly tied to experiences with, or influence of, the parents even when this is not the topic of the question. Brings past into discussion of the present and vice-versa. Sentences or conversational turns taken often excessively long. |
| **Disorganized**  Infant displays disorganized or disoriented behavior, inexplicable in terms of an overall strategy or goal. Criteria include simultaneous displays of contradictory behavior patterns, such as very strong attachment behavior followed by avoidance, freezing or dazed behavior; strong avoidance with strong contact seeking, distress or anger; extensive expressions of distress, with movement away from, rather than toward, the mother; indices of apprehension toward the mother such as hunched shoulders or fearful facial expressions; multiple rapid changes in affect.  Likely to show ‘disorganized controlling behavior’ by preschool and elementary school age. | **Unresolved/Disorganized**  During discussion, particularly of loss or abuse, individual shows striking lapses in the monitoring of discourse, e.g. indicating a belief that a dead person is still alive, or was killed by a childhood thought. May lapse into prolonged silence or eulogistic speech. |

**(e) Attachment, psychoanalysis, conflict, and identification**

These tables illustrate how the criteria for insecure classifications turn on signs of conflict between ‘positive’ and ‘negative’ emotions, with the ‘positive’ being those involved in maternal comfort, exploration, and play, and the negative those of anger, separation distress, and fear. Thus in infants both ambivalent/resistant and avoidant behaviors manifest anger at the mother for imposing the distress of separation, with both distress and anger amplified in those classed as avoidant/resistant and suppressed in those classed as avoidant. Some infants classed as ambivalent/resistant also show fear of the mother, as do many classed as disorganized, and in both this fear seems to inhibit the expression of anger towards her. In the case of disorganized infants such anger and fear are later shown in coercive relationships, both with the mother and playmates and others. Conflicts similar to those shown in infancy are found in the adult categories, with anger and fear again amplified and explicit in those classed as preoccupied, and suppressed (and idealized) in those classed as dismissing. The emotional conflicts of those classed as disorganized in adulthood also show the kinds of incoherence in thought and imagining that are found in mental disorder (e.g., in Freud’s (1909d) patient the Rat Man).

As well as these comparisons, the table represents two directions of developmental correlation. First, infants tend to develop forward from 12 months in accord with their original classification, so that being a secure or insecure infant is a start towards having secure or insecure states of mind in regard to attachment as an adult—together with a range of related consequences for relationships, and life more generally. Secondly, research by Peter Fonagy and others (Fonagy, 2000; Fonagy, Gergely & Target, 2008) has shown that there are relatively strong correlations between the categories assigned pregnant women via the Adult Attachment Interview, and those to which their as-yet-unborn infants will later be assigned, in the strange situation from 12 months after birth.

These predictive relationships seem mainly determined by the experience that unfolds between mother and infant after birth, as opposed to their genetic overlap (see Howe, (2011, chapters 14 and 15); van Ijzendoorn (1995); and Vaughn, Bost, and van Ijzendoorn, (2008)), although genetic factors may be more important in disorganized attachment than in the other categories.[[24]](#endnote-24) Taken broadly, these data seem as we should expect them to be, given the psychoanalytic hypothesis that bear on them. In the case of the forward correlations from 12 months the psychoanalytic hypotheses would be: (i) that mental disturbance or disorder is characteristically rooted in emotional conflict, and; (ii) that later conflicts are underlain by conflicts about parental figures that can be traced back into infancy. Conflicting emotions towards the mother seem to have been shown clearly in the strange situation and by further research to be important for later relationships and development generally.

Likewise the correlations between maternal and infant categories are as would be expected, given the psychoanalytic hypothesis that infants learn their basic ways of coping with emotion by identifying with their parents. In this, as we saw earlier, identification is understood as “the assimilation of one ego to another” (Freud 1933a, p. 63); and in post-Freudian (e.g., Kleinian) theory the most basic and formative identifications are assumed to be established during the first year, and via the nursing and caring relationship between mother and infant. Such identificatory mechanisms may help explain not only likenesses between infants and mothers, but also many other kinds of assimilative learning (e.g., of language). And with the discovery of mirror neurons and other neurological mechanisms that seem to enable identification, this notion has now come generally to be assigned the kind of importance in development that it was originally given by Freud.[[25]](#endnote-25)

**(f) Infantile disorganization and childhood determination to control.**

To see more of the importance of this let us take two examples of the transition from infantile disorganization to childhood ‘disorganzied controlling behaviour’ (from Solomon and George (1999)). Thus consider a little girl in the strange situation at 18 months:

In the second reunion Kate approached her mother with her arms outstretched towards her mother. When she was about two feet away from making contact, she moved her arms to the side and abruptly circled away from her mother like a banking airplane. As she moved away she had a blank, dazed expression on her face (p. 131).

And then at 32 months with her mother helping her to complete a series of tasks:

…on three different occasions when Kate completed the tasks incorrectly, her mother moved a piece to illustrate the correct procedure. Each time Kate screamed “No!” and ordered in a threatening tone, “Put it back!” On each occasion her mother obeyed. (139).

And finally at 42 months with a boy called Trey:

Pretending to bake a cake in a toy oven, Kate said in a very loud, bossy tone, “You can’t have cake now! Go away: you can’t have cake ‘till I call you!” She then ordered Trey to get some dishes for her. She frowned when she saw what he brought and scolded him, shaking her finger with her hand on her hops. Trey pretended to eat…Kate yelled “No! It’s not done!”…she ordered him to go away…when he didn’t move she pushed him roughly, and he fell to the floor…(p. 150).

Again consider a boy in the strange situation at 18 months:

In the first reunion, Sam approached his mother with his eyes cast down. When he was about two feet away he looked up at her, rising suddenly and making gasping noises with his breath as he did so. He quickly looked down again, bared his teeth in a half-grimace/half-smile and turned away. Hunching his shoulders and holding his arms and legs stiffly, he tiptoed to the other side of the room. He sat motionless in the chair for 30 seconds, grasping the armrests and staring straight ahead with a dazed expression (p. 131).

Then at 42 months with a friendly little girl called Jenny who tries to interest him in playing with dolls:

At first he ignores her overtures but finally he takes the doll she offers …[and] alternates between brushing its hair tenderly and smashing it against the floor. Jenny tries to integrate Sam’s behavior into her pretend play...she pretends the doll is saying in a squeaky voice ‘Ow, don’t do that!’…. Jenny tries again, making her doll say ‘I’m going on the bus.” Sam grabbed the toy bus before Jenny could put her doll in it, crammed his doll in, and drove the bus away. Jenny gave up trying to play with Sam (p. 153).

And finally, playing with a boy named Davy:

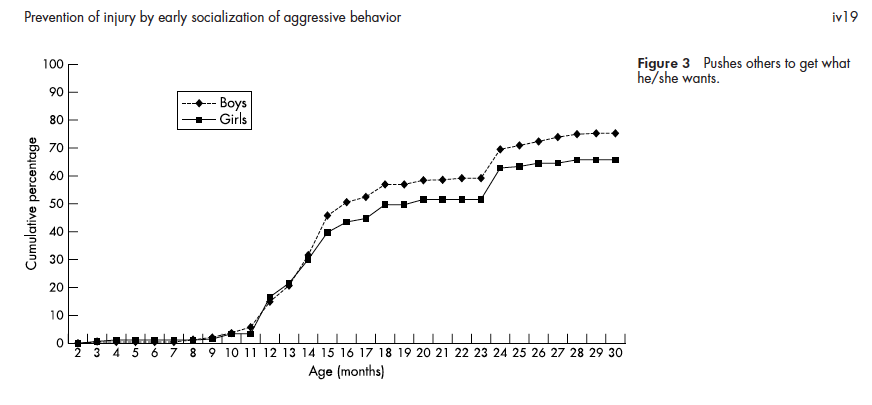
Sam (54 months) grabbed a syringe from the toy doctor’s kit Davy was holding and gave him a “shot”. When Davy ignored this, he shined a flashlight right in Davy’s eyes, while making strange whooping sounds. Davy also ignored this and suggested that they play with puppets. Sam took a puppet that Davy offered and then made his puppet “bite” Davy’s nose while Sam grinned and giggled. He continued even after David repeatedly told him to stop…Davy finally ignored Sam and turned his back on him (p. 153).

These last instances were more strange than aggressive, for they seem to have been done without focused intent to cause pain or discomfort. They may indicate how difficult it is for a child with such conflicting emotions— see the alteration between tenderly brushing the doll’s hair and smashing it against the floor above—to find a coherent way of behaving and feeling towards others. But Sam was also aggressively controlling with his father, as we will see below.

**(g) Identification, aggression, and sexuality**

Further points emerge as we consider the period that leads up to the 12-month consolidation. Wittgenstein (1998) once remarked that “Anyone who listens to a child’s crying with understanding will know that psychic forces, terrible forces, sleep within it, different from anything commonly assumed. Profound rage and pain and lust for destruction” (p. 4e). Although it can seem sacrilegious to mention infancy, aggression, and mothers in the same breath, we should expect the infant’s learning to regulate its own anger towards its mother, which seems so important a feature of attachment, to be an important part of its learning to regulate its anger towards persons more generally. The idea that infants base later relationships on earlier paradigms in this way is one of the main findings of attachment research.

Such self-regulation seems particularly important, in light of agreement among researchers on aggression that as Tremblay (2008) reports, children use physical aggression naturally and spontaneously from when they are first able to do so, and such aggression is at its most impulsive and forcible early in life, and tends to decline thereafter. Here is one of the tables with which Tremblay (2002) illustrates his claims:



As Tremblay says, children “have the physical, cognitive and emotional means of being physically aggressive towards others by 12 months of age … most children will ‘onset’ hitting or biting or kicking another child or even an adult before their second birthday” (p. 2617). In light of this, and the way such violence declines later, we should conclude that from infancy onwards ‘rather than to physically aggress’ children ‘learn not to physically aggress’.

But then why do some children *fail* to learn ‘not to physically aggress’, and when does such failure in learning begin? Tremblay discusses this via individuals who show *chronic physical aggression*; and here again early experience, particularly in relation to the mother, seems important. One of the most important predictors of chronic physical aggression is the behaviour of chronic aggressors’ mothers, particularly antisocial behavior in adolescence. And assessments from the 5th month after birth—that is, some 7 months *prior* to the 12-month consolidation discussed above—indicate that family dysfunction, and coercive-hostile parenting by mothers, are particularly significant (see Tremblay, 2002, 2008).

Above we reflected on how mother-infant correlations in attachment data might be understood in terms of ‘the assimilation of one ego to another’ in infantile identification with maternal ways of regulating emotional conflict. Clearly Tremblay’s data on chronic physical aggression might be understood in the same way, that is, as involving identification on the part of infants or children with parents in dysfunctional relationships, including their own hostile-coercive mothers. (And of course Anna Freud regarded identification with an aggressor as a particularly important mechanism of defense.)[[26]](#endnote-26) We see something that may be related to this, and that is also related to what might be regarded as dysfunction in the family relation between child, mother, and father, in the cases of Sam and Kate discussed above.

Sam’s mother behaved towards him in ways that might be considered as showing dissociated anger or hostility. Once when he was doing badly in an intellectual task, she:

…became visibly tense, her voice harsh. Sam’s voice softened. His shoulders tensed as he said to his mother in a soft, pleading tone, “I don’t know any more Mommy. I don’t know any more, Mommy.” His mother stared ahead and stilled for a full 42 seconds. Sam twisted his foot and arm, appearing anxious, and he repeated over and over in the same soft, pleading voice, “I don’t know mummy”, while leaning up against her and patting her knee several times to more her out of what appeared to be a dissociated state. Sam’s mother did not respond at all…. (p. 137).

Again at 56 months his mother:

…asked Sam to bring over a box of dress-up clothes. She then proceeded to dress herself up…asking Sam to help her, which he did. She said “I love this! How do I look?’ When Sam just smiled, she took a duck puppet and made it bite his ear (p. 137)

This last was a minor and playful bit of aggressive behavior, and related to a kind of request for admiring flattery on the part of his mother that Sam was familiar with. Still her slightly aggressive response to not getting the kind of attention she wanted in this instance was the same that Sam had directed at Davy two months before, while seeming not to understand that it was unusual and unpleasant. And while Sam’s mother might show hostility to him, he seems from early childhood to have directed his hostility elsewhere. While Sam was still disorganized in relating to his peers, he had settled strategies in relation to his parents. He attempted to control both of them, but his method was affectionate in relation to his mother, but hostile and punitive in relation to his father:

At the family dinners observed when Sam was 44 and 56 months old …while he was pleasing and caregiving towards his mother he was punitive and derogating towards his father. Sam and his mother ridiculed nearly everything his father said and did, speaking to him in a hostile and demeaning voice ... Many times during dinner, Sam’s mother spoke to her husband through Sam, and Sam spoke to his father through his mother. Twice during dinner Sam ran over to whisper a secret in his mother’s ear, and the two of them giggled. When Sam wanted something he asked his mother…[using] a soft, sweet voice. In contrast, he made stern demands of his father, using a mocking, challenging, authoritarian tone…”Don’t you take that piece! It’s for me!” (p. 141).

In this Sam’s identification with his mother, and hers with him, seems to have been enacted in an alliance to belittle his father. Each spoke to the father through the other, thus identifying him- or her- self with the other in delivering the current message, whatever it happened to be. Something similar could be observed in Kate’s family, but with father and daughter in alliance against Kate’s mother:

Kate’s father said to Kate, “Mummy is trying to be so polite, eating her eggroll with a knife and fork. We don’t do it that way, do we Kate?” Kate says “No!” and they both laugh derisively at her mother. Later Kate purposely opened her mouth full of chewed food to show her mother. Her mother said seriously “Don’t show food.” Her father smiled and said “Hey Kate show food!” He then said “Eww!” and laughed appreciatively at her display… (p. 141).

Beatrice Beebe and her colleagues (2010) have demonstrated that disorganized attachment of the kind shown by Sam and Kate in the strange situation can be predicted from microanalyses of videos of mother-infant interactions from as early as the 4th month, that is, from the beginning of the change from the paranoid/schizoid to the depressive position discussed above. These reveal, among other things, a range of fleeting expressions of emotion on mothers’ and infants’ faces that include anger and fear, as well as others that might be hypothesized to contribute to later disorganization or aggression. The ability to form such facial expressions seem to develop prior to birth, and independently of experience; and such expressions can be detected from early infancy, and are particularly evocative and imitable in face-to-face contact.[[27]](#endnote-27) So this seems a plausible locus for the infant-mother identifications that will be apparent from something like 12 months, as well as for the incipient disorganization that face-to-face interactions can be used to predict.

But as the vignettes above suggest, the disorganized infant’s relationships with others develop within, and are shaped by, their parents’ relations with one another. The infantile feelings of anger towards the mother, distress at separation, and fear that were so prominent in the strange situation at 18 months in Kate and Sam seem to have been shaped and focused via their ongoing relations with both parents, and as part of what Freud would have regarded as part of a triangular Oedipal relationship. Although attachment research has not focused on the development of these aspects of early internal models, the general perspective of attachment gives such development a readily intelligible place in empirical developmental psychology.

A main thrust of attachment research has been to show how emotional relationships in infancy, beginning with those to the mother’s breast, face, body, and voice in the first months of life, serve for *learning*, and as *precursors* and *developmental bases* for behavior in later relationships. This is consistent with the understanding of Kleinian phantasy in terms of unlearned modes of representation that enable the infant to make sense of its postnatal experience of persons, as sketched above; and we should expect such early preparation and learning to extend to behavior in relationships that contribute directly to later reproductive success, namely those of courting, mating, and procreation.

In this connection, and as we shall consider further below, we should remember that such reproductive relationships are systematically interwoven with aggression. Aggression between members of the same sex—males against males, and females against females—commonly plays a role in competition between members of the same sex for reproductive opportunities with members of the opposite sex, and in relation to the fate of offspring conceived in such relationships. Thus males of many species not only fight one another over reproductive access to females, but also kill the offspring of other males, the better to mate with their bereaved mothers. The same patterns also appear among females (e.g., with dominant female of meerkats killing the offspring of subordinate females).

Human patterns are far more socially co-operative but nonetheless show similar male-male and female-female rivalries, for which we might expect the experience of emotion in infancy to provide preparation. Taking Kate and Sam’s behavior in play together with their alliances as shown at the dinner table, we can see something as to how their initially disorganized infantile feelings seem to have developed in this respect. Both appear to have focused their early patterns of affection and aggression in accord with, and as preparation for, later adult patterns connected with courting, mating, and childrearing. Each had formed an affectionate alliance as small but active partner of the (dominating) parent of the opposite sex, and a corresponding aggressive attachment to the parent of the same sex—as if in preparation for later relationships with members of the opposite sex and later rivalries with the members of their own.

This cluster of object-relationships seems also to have been enacted in their play as prospective members of reproductive partnerships in later life. Kate’s play as a housewife with Trey, for example, suggests that her present alliance with her father in dominating her mother may also play a role in preparing her for adult relationships of domination and/or submission with later partners; and one might think likewise in considering Sam in his still disorganized play with Jenny and the doll she put into his care. Such connections, although not recorded in these cases, would be concordant with other research on the relation of infant and childhood attachments to later sexual and romantic relationships (See Berlin, Cassidy, and Appleyard (2008) and Feeney (2008).

As these examples indicate, the relationship between mother and infant is only one factor—although one that may be partly measureable—in the generation of disorganized attachment and the coercive behavior that often follows it. The same would seem to hold for the fostering of chronic physical aggression that Tremblay traces to family dysfunction and hostile-coercive parenting. If these forms of aggression in relationships can be taken to originate in identification with hostile or coercive mothers, or in the kinds of face-to-face mother-infant interactions that enable Beebe et al. to detect incipient disorganization from the 4th or 5th month of life, this will be because the patterns of emotion discernable in these interactions are themselves supported and shaped, both earlier and later, by triangular relationships in the family.

**(h) Attachment and neuroscience**

So far we have been linking aggression and sexuality—two main themes in Freud—with early emotional conflict via attachment. There seems a good prospect that connections made in this way will also be investigable by neuroscience, and in ways that link with a broadly psychoanalytic conception of the mind. For according to an increasingly influential view in neuroscience human beings are born with their cerebral cortices as yet undeveloped, but with the subcortical neural mechanisms now thought to generate motivation and consciousness intact and ready to function, and wired for communicative expression in the baby’s voice, face and hands.

In consequence the infant’s cerebral cortices, and the nascent systems of conceptual thought and memory realized in them (short- and long-term procedural memory, semantic memory, episodic experiential memory) develop under the impact of experience, including experience of the infant’s already active emotions and the things and persons at which they are directed. Foremost among these, normally, are the infant’s mother, and presumably also its own self, which requires to be learned about via perception and emotional interaction as do other things. So these relationships are begun in a context provided by the activation of the infant’s subcortical mechanisms of motivation, and its mother’s and its own responses to these activations, from *before the infant becomes able to think about its mother, itself, or the relationship between them that is already in train.* The earliest and most basic memories may thus be the pre-conceptual embodied ‘memories in feeling’ about oneself and others that Klein took to be active in infantile phantasy.

As a number of neuroscientists have observed,[[28]](#endnote-28) these basic mechanisms correspond to what Freud described in terms of the drives, or again the part of the id that was present from birth. By contrast the role of the cerebral cortices, as the infant comes gradually to know itself, its mother, and their relationship, and so to regulate its emotions accordingly, is that which Freud assigned to the ego. So we can say that as development proceeds, and the infant begins to gain voluntary control over its bodily functions and activities, its cerebral cortices come to stand as ego—as top-down integrator, conflict-resolver, and regulator—to its already active subcortical id. We have already seem the importance of the resolution of motivational conflict in attachment, and noted that infants seem initially to identify with their mothers in doing so, and perhaps by mechanisms that neuroscience is starting to specify. This accords with Freud’s account of the ego as formed via identification; and if choices among possible courses of action are made by a process like affordance competition (see Cisek & Kalaska, 2010), then the resolution of conflict among desires rooted in the basic mechanisms will be intrinsic to decision itself.

In his early attempts at a neuroscience of motivation and emotion Freud described the basic mechanisms of motivation as rooted in ‘endogenous stimuli’ that “gave rise to the major needs…hunger, respiration, sexuality” (Freud, 1950 [1895]), p. 297). These ‘endogenous stimuli’ are now often seen, in Antonio Damasio’s phrase, as “part of a multi-tiered and evolutionarily set neural organization aimed at maintaining organismic homeostasis” (Damasio et al., 2000, p. 1049). The tiers include inbuilt mechanisms that generate distress at hunger, thirst, excessive heat or cold, lack of oxygen, or other situations that threaten basic bodily equilibrium; and also ‘emotional command systems’ that generate motivated behavior, as well as the conscious experience by which it is regulated. Research on these mechanisms has recently been collated, summarized, and advanced by Jaak Panksepp, in a number of influential publications.[[29]](#endnote-29)

Watt and Pankesepp (2009) describes these ‘prototype emotional regulatory systems’ as “sitting over homeostasis proper (hunger, thirst, temperature regulation, pain, etc.)” and as “giving rise to attachment” which establishes “the massive regulatory-lynchpin system of the human brain”, exercising “primary influence over the prototype systems below” (p. 93). As this entails, the cortex—or again the cortical ego – develops at first as a regulator of attachment, and thereby of the emotions and experiences involved in the process. The same basic systems seem to generate the subcortical components of emotion and consciousness in all mammals[[30]](#endnote-30), and Panksepp describes them in capital letters to indicate their status as subcortical and experimentally defined, and hence also their status as prior to the working of the cortex which in the course of development comes increasingly to regulate them. But as the cortical ego enlarges its role over the course of development, so that the generation of desire and action is increasingly regulated by learning and memory as these are routinized and distributed throughout the cortex, the role of the basic mechanisms becomes progressively more complex and less salient. [[31]](#endnote-31)

The main systems include generators for the ‘negative’ affects of RAGE (related to anger and affective attack), FEAR (related to fear, freezing, flight), and SEPARATION DISTRESS/PANIC/GRIEF (hereafter SPG, and related to onsets of panic as well as distress at separation, grief in loss of attachment and mourning, and also to the pain of social exclusion, social loss, and depression), and to the ‘positive affects of LUST (related to sexuality, courting, and copulation), PLAY (related to mammalian play, and human social pleasure and enjoyment more generally) and CARE (maternal and paternal nurturance, and the infant’s or child’s actions or identifications that accord with these). These are integrated with a general SEEKING system, which drives foraging and exploration, and (given cortical guidance in the form of desire) reward-anticipating intentional action.

These systems have built-in relations of competition and co-activation, and so can conflict with one another, or again work in harmony. Thus RAGE and FEAR tend to be partly co-activating, as they prepare for both fight and flight; but are also partly competitive, as the balance between fight or flight is determined. Likewise SPG tends to activate RAGE and FEAR, preparing a separated creature for the worst, but can also de-activate SEEKING, producing a depression-like motivational inertia. Similarly FEAR and RAGE compete with PLAY, where as SEEKING, PLAY, and CARE may all be components of interactions between parents and offspring. Also of course SPG operates to keep parents and offspring, or again (more or less monogamous) parents together, and so, despite the painful of activation, regulates LUST as well as CARE, and thereby attachment generally. They can be activated either by the exteroceptive sensory systems (such as sight, touch, or hearing, or again by the interoceptive systems that monitor the interior of the body.

This role of these systems in relation to attachment emerges particularly clearly in Ainsworth’s strange situation, for every phase in the procedure—from the exploration (SEEKING) and play (PLAY) with which it begins, through the anxiety (FEAR) produced by the entrance of the stranger, the angry protest (RAGE) of the infant at the mother’s impending departure, the anxiety endured (SPG together with RAGE and FEAR) while she is away, and the relief (from SPG, RAGE, and FEAR) produced by her return, which otherwise remains in opposition to the evoking and receiving of CARE, and therefore also the infant’s return exploration (SEEKING) and play (PLAY)—is keyed to one or more of the subcortical systems Panksepp describes. This consilience was of course unknown to Bowlby, or to Ainsworth when she devised the strange situation, and it remains unknown to researchers uninterested in neuroscience. But it suggests that in setting out to test psychoanalytic ideas experimentally, Ainsworth was particularly prescient.

In less complex animals the activation of these systems can be total and frightening, as indicated by Panksepp’s description of stimulating the RAGE system in a cat. Within seconds the cat:

…lept viciously towards me with claws unsheathed, fangs bared, hissing and spitting. It could have pounced in many different directions but its arousal was directed right at my head. Fortunately a Plexiglas wall separated me from the enraged beast. Within a fraction of a minute after terminating the stimulation the cat was again relaxed and peaceful, and could be petted…(Panksepp, 1998, p. 194).

In our far more social and co-operative species, however, and as between parent and child, they clearly serve the complex social functions. Thus as Vausdevi Reddy describes an experience known to many a parent:

Shamani…had become hungry quickly and had wanted another feeding for some time. At first Shamani remained quiet, then became restless, and then, after some fussing, she frowned. Then she yelled—a furious-sounding shout. Louder in volume than any other vocalization I had heard, and clearly filled with rage. Then she made no other sound, although the look on her face remained angry. I was taken aback, and felt almost guilty (Reddy & Trevarthan, 2004, p. 11).

Shamani was a five-week baby, who may already have begun the rhythmic face-to-face interactions of turn-taking smiling, vocalization, and mutual recognition that developmental psychologists call ‘proto-conversations’, and so was already aware of her mother’s caring presence. So by this time she will have learnt how the expression of anger can serve as a mother-mobilizing form of communication.[[32]](#endnote-32) Reddy describes this kind of interaction as familiar between her and Shamani at six weeks, when she saw how upset Shamani becamed when she interrupted such an exchange with a still face.

In the midst of a good smiley “chat”, when she was lying on the bed and I was leaning over her, I stopped, with my face pleasant but immobile, and continued looking at her. She tried to smile a bit, then looked away, then looked back at me and tried to chat, then looked away again. After maybe 30 seconds I couldn’t stand it any longer and, smiling, I leaned forward and hugged her, saying “Oh you poor thing!” At this, she suddenly started crying…I was shocked, and very moved. I didn’t know she cared. Neither reading about [still face] research, nor even subsequently watching Lynne Murray’s videos of still face experience, told me quite as much as this experience ((Reddy & Trevarthan, 2004, p. 11)

As Reddy says:

If you allow yourself to be similarly engaged by a 2-month infant—especially an infant whom you know well and who knows you—it is impossible to resist becoming involved and talkative. It is impossible, then, to doubt the baby’s communicative intent, or to argue that the baby’s acts merely *appear* to be responses to yours. We cannot assume that the babies’ actions are merely some kind of biologically programmed reflex behavior lacking appropriate feelings. Similarly we cannot assume that the baby is merely appreciating and testing the “mechanical” contingency of your behavior in time, with no appreciation for its affective or companionable content (Reddy and Trevarthan, 2004, p 12)

Interactions like these, and also the more complex examples of social behavior discussed by Reddy in the article from which these quotations are taken, may make it more understandable that research such at that reported by Beebe et. al. (2010) should detect signs of incipient disorganization—and hence of the later need to control others, as was shown by Sam and Kate—in face-to-face exchanges between mother and baby during the 4th month. But then in the case of a newborn baby, who has as yet no such experience of interactive communication and the forms of homeostatic and emotional relief they can bring, we should expect more primitive expressions not only of RAGE, but also of FEAR and SPG, as a newborn’s particularly riveting and compelling cry seems to contain.

This is because alerting the mother’s CARE system is a continual matter of life and death for the helpless human infant, not only in the period immediately after birth, but over the whole of the first year and beyond. The expression of such basic ‘negative’ emotions, and in their earliest and rawest form, would seem to be the newborn infant’s only way—particularly in the case of a preoccupied or inattentive parent—of coercing or compelling the nutrition, comfort and other expressions of maternal CARE without which it would waste and die. This is presumably also why infants are so upset by an unresponsive face, as Reddy found to her surprise. (And her responses to her own child’s distress indicate how, even in mild instances, the infant’s arousal of care can cause anxiety, guilt, and remorse in a mother, as presumably evolution has shaped it to do.) The baby’s nascent awareness of these contingencies, and its utter dependence on maternal care and solicitude, show even earlier than Reddy records, since the baby begins to connect mother’s face and voice, and visual and tactile input from her breast and body, from almost immediately after birth; and by two or three months a baby is acutely distressed, evincing what seems an early version of its later fear of strangers, in experiments in which it encounter’s mother’s face, but speaking with another’s voice (on this see Carpenter (1975, p. 134.).

The infant’s other means of securing these resources is via the activation of the systems Panksepp describes in terms of SEEKING, PLAY, and LUST, and so engaging the mother by via the sort of affectionate (and in the case of sucking at the breast, often intensely sensual) interactions that Reddy describes in terms of protoconversation above. But then, as this makes clear, the inevitable early activation of *all* the systems of basic emotion—positive and negative alike—towards one and the same person, the nursing and caring mother, must constitute a source of emotional conflict that is inherent in the long and helpless infancy of our species.

This seems particularly clear in the context of attachment, for the conflicts aroused in the strange situation put RAGE, FEAR, and SPG into conflict with evoking and accepting CARE, and with it SEEKING and PLAY. The former are components and precursors of later hatred and enmity, and the latter, together with LUST, are components and precursors of later affection, nurturance, and love. These are clearly the kinds of conflicts that will be important in later life, we have already seen, as exemplified in Sam and Kate, how these precursors may be transformed in the family into post-disorganized strategies of control. These involved both co-operative and affectionate control, as in the case of Sam and Kate and their dominating parents of the opposite sex, and hostile punitive control, as in the case of Sam and Kate and their dominated parents of the same sex; and again, as if identification with the dominating parent, with playmates of the opposite sex (although Sam’s capacities for punitive aggression remained disorganized in this respect, and were mainly shown in his smashing the doll given him by Jenny to play at being a parent.) Similar precursors, as shaped by parental dysfunction and hostile-coercive parenting, were also predictors of chronic physical aggression.

1. **The basic mechanisms and clinical psychoanalysis**

We can also see the working of these mechanisms—and the conflicts among them—in clinical data. For example the particular emotion of distress at separation, and the anger this was liable to arouse, played an important role in Freud’s patient the Rat Man (Freud, 1909d). In his preliminary consultation with Freud this patient described “compulsive impulses to cut his throat with a razor” and mentioned also his “impulse to commit a crime against the lady he venerates.” (Hawelka and Hawelka, 1974, p. 1) [[33]](#endnote-33)

As Freud recorded, “this impulse [to commit a crime] remains silent when she is present; it arises in her absence”—that is, his impulse to commit a crime against his lady, like the angry protests and crying of infants in the strange situation, seemed to originate in his angry distress at his object of attachment leaving him alone. Again in the Rat Man’s eighth session (Freud, 1909d, p 260) he described how when his lady went away to visit her grandmother he received an imaginary command to cut his own throat, and as he went to get his razor to carry this out he received another command, saying “No it’s not as simple as that: you must kill the old woman” As in the case of his impulses to commit a crime against his lady, these impulses to kill himself, and then to kill the old woman he took to be responsible for his lady’s absence, seem to have arisen from his distress at separation. In Freud’s account they impulses showed first the anger against himself, and then the anger against the old woman, that the separation roused in him.

This cluster of emotions was tacitly emphasized by Klein (e.g., in her emphasis on interpreting the analysand’s reactions to separations at weekends and holidays), and also in attachment research, where protest at separation from the mother, and the grief-like pain of missing her and fearing her loss (as well as mourning, depression, etc., related to this) were part of Bowlby’s original framework for understanding the role of attachment over the lifetime. As realized by Panksepp’s SPG, which is liable in turn to activate both RAGE and FEAR, these emotions play a role that seems to accord with the general idea of a cortical ego regulating subcortical drives that we have been considering.

The same emotions were particularly clear in Elyn Saks’ case, in what Kleinian analysis would regard as her infantile transference to her analyst. As her analysis progressed her psychotic thoughts grew more violent during her sessions, and her relationship to her analyst became suffused with three partly contradictory currents of imagination and feeling, in which we can recognize the triad of RAGE, FEAR, and SPG, and in conflict with CARE, as described in connection with the both the strange situation and Panksepp’s neuroscience above. So for example Saks (2008) associated to her analyst:

…You are an evil monster…a witch…you are trying to kill me…Don’t cross me. I’ve killed hundreds of thousands of people with my thoughts… (p. 97).

Or again she thought to herself:

She is evil and dangerous…She is a monster. I must kill her, or threaten her, to stop her doing evil things to me (p. 98).

The closer Saks felt to her analyst the more terrified she became. She perused shops for weapons, and for period brought a box-cutter or serrated knife to her sessions (which of course she never had occasion to use). As with the appearance of the superego in Freud’s dream, we could hardly ask for clearer evidence of emotions related to Panksepp’s systems of RAGE and FEAR, as related to malevolence projected into the figure of the analyst, and in this, again, comparable to the lack of conscientiousness projected into Otto in Freud’s dream. But this was also regulated by emotions related SPG, and in relation to what Saks regarded as a profound and healing form of CARE:

At the very same time as I was terrified of Mrs. Jones, I was equally terrified that I was going to lose her, so much so that I could barely tolerate weekends when I would not see her for two days. I would start to unravel on Thursday and be nearly inconsolable until Tuesday. In the intervening time it took everything I had to protect myself…all the while plotting ways to keep Mrs. Jones from abandoning me. *I will kidnap her and keep her tied up in my closet. I will take good care of her…She will always be there to give me psychoanalysis*…her steady and calm presence contained me, as if she were the glue that held me together. I was falling apart, flying apart, exploding – and she gathered my pieces and held me. (Saks, 2008, pp. 97-98, italics in original)

As well as providing examples of the kinds of conflicting emotions activated in the strange situation, and of Panksepp’s RAGE, FEAR, and SPG in conflict with the receipt of CARE, Saks’ phantasies instantiate the kind of conflicting motives directed at one and the same person, originally a parent, that Freud hypothesized to be formative for the superego, and also active in neurosis and psychosis. Also they exemplify the states of mind that Klein described in terms of the paranoid/schizoid and depressive positions, in which the same person (originally, in Klein’s account, the mother, or the part of her that was the most important early sensory focus, her breast) is felt either as extremely bad and threatening or as extremely helpful, good, and liable to be lost owing to one’s own aggression. So on their hypotheses—as indicated by Freud’s remarks on the regressive fragmentation of the superego/ego-ideal in schizophrenia—the passage from depression to schizophrenia considered earlier would represent a reversal of the process by which the self-condemning part of herself manifest in her depression was originally formed.

On this kind of account the gathering together of her fragmenting self that Saks gratefully ascribed to her analyst would represent a partial reworking in the present of basic processes of integrating the self that take place during the initial consolidation of attachment between an infant with its mother (and other carers) the first year of life. Likewise the pain of separation that Saks found so intolerable at weekends, and the grief and phantasies of control that it evoked, would partly repeat those of an infantile self suffering SPG, and so threatened with the loss of the parental presence that seemed the source life and coherence for the self. On these points attachment theory and Panksepp’s attachment-related neuroscience would seem broadly consilient with Kleinian (and other Post-Freudian) claims.

The hypothesized re-activation of infantile conflicts in Saks’ transference, and the consequent extension of the role of her cortical ego in regulating them, seems to have been therapeutic. Although she remained liable to hallucinatory presences, she found that as she:

…became accustomed [in analysis] to spooling out the strange products of my mind my paranoia began to shift…the actual daily people in my comings and goings seemed less scary and more approachable…slowly I made one friend, then two…I began to move back into the world again…Blinking and shaky (as though I’d been in a cave, and the light, as welcome as it was, was something I had to get used to) I began to move back into the world again (Saks, 2008, pp. 93-4).

Also it seems that such a result might fit with the recent work in the neuroscience of dreaming and memory we noted above. If we suppose, as Hobson and Friston (2012) hypothesize, that the powerful emotional activations and vivid hallucinatory experiences of REM dreams serve to consolidate memory and optimize the models of the world by which we live, then we should also consider that the emotions and fictitious experience involved in mental disorders may arise from the same processes. This hypothesis—that emotional activation and fictitious experience in mental disorder result from attempts at consolidation, optimization, and complexity reduction on the part of a disordered brain—would explain the extensive similarities between dreams and mental disorder noted above.

In these terms the projective reduction of guilt and conflict with the superego that seems to have taken place in Freud’s dream could be seen as one form of simplifying optimization, Saks’ projective transition from painful internal conflict to externalized conflict with shadowy presences another, and the arousal and reconsolidation of early memories and conflicts in her analysis a third. Although this claim is now speculative, it indicates the kind of theoretical unification in accord with Freudian claims that current neuroscientific hypotheses might support.

**(j) Evolution**

We have noted that Freud’s division of the mind into ego, superego, and id seems to correspond with the notion of an action-directing and conflict-resolving cortical ego, as recently elaborated via neuroscience. We have also noted that emotional conflicts involving deep sources of motive such as RAGE, FEAR, and SPG seem natural liability of human infancy. Deep connections of this kind suggest that the kinds of emotional conflict considered in psychoanalysis may have roots in the same evolutionary processes that have lengthened the helpless period of human infancy while enlarging the cortically immature brains that are shaped by experiences of attachment over its protracted course. And as regards evolutionary sources of conflict, psychoanalysis indicates an obvious place to look.

**(k) Hostility to siblings and parental sexuality**

From the time Freud wrote *The Interpretation of Dreams* (Freud, 1900a) he argued that everyday rivalries between brothers sisters were underlain by deeper unconscious hostilities. This was later borne out by Klein’s analyses of children, who often played out astonishingly hostile phantasies towards siblings, but in the context of intense holtility directed at the mother and father and their sexual and procreative relationship (for recent discussions see Edwards (2011) and Mitchell (2003).

We can illustrate this by some clinical material, starting with an example from Klein’s (1932/1969) work with a girl of 6, who was anxious, depressed, and obsessional. She expressed her depression by brooding with a suffering expressing, saying sadly that “there is something about life that I don’t like.” (p. 67) She defended herself from such feelings, among other ways, by the excitement of masturbating, which she did in front of strangers and almost continuously at her kindergarten. She regarded her mother as fond of her, never criticized her, and was, if anything overly affectionate towards her. But a quite different aspect of her feelings emerged in her play. Thus in her first session:

Erna began her play by taking a small carriage which stood on the table and letting it run next to me. She declared she had come to fetch me. But she the put a toy woman in the carriage and added a toy man. The two loved and kissed one another and drove up and down all the time. Then a toy man in another carriage collided with them, ran over and killed them, and then roasted them and ate them up (Klein, 1932/1969, p. 67)

Here the man and woman who loved and kissed one another, and in consequence were killed, roasted, and eaten up, could be identified as the parents.[[34]](#endnote-34) The same theme showed more explicitly in other material, as the child re-expressed the preoccupations with which she began. For example Erna played a queen who married a king, and when she:

had celebrated her marriage to the king, she lay down on the sofa and wanted me [Mrs. Klein], as king, to lie down beside her. As I refused to do this I had to sit on a little chair by her side instead and knock at the sofa with my fist. This she called ‘churning’…Immediately after this she announced that a child was creeping out of her, and she represented the scene in a quite realistic way, writhing about and groaning. Her imaginary child then shared its parents’ bedroom and had to be a spectator of sexual intercourse between them. If it interrupted it was beaten…If she, as mother, put the child to bed it was only in order to get rid of it and to be united with the father all the sooner (Klein, 1932/1969, p. 71).

Freud often described how the parents are represented in dreams by Kings and Queens. Here Klein understood her little patient as using the same symbolism, to represent her phantasies about parental intercourse. Since her ideas about this were immature and incomplete, she represented it by the parents lying in bed with something knocking something, and ‘churning’; and she represented the connection between intercourse and pregnancy by giving birth immediately after the ‘churning’ had taken place. In this, however, she represented herself and her parents as in deep conflict about sex and procreation, with her mother constantly neglecting and abusing her to get on with making babies. Thus conflict about procreation had affected her attitude towards her parents, and towards people in general, in a deep and pervasive way. As Klein recorded:

Erna often made me [Klein] be a child while she was a mother or teacher. I then had to undergo fantastic tortures and humiliations. If in the game anyone treated me kindly, it generally turned out that the kindness was only simulated. The paranoid traits showed in the fact that I was constantly spied upon, people divined my thoughts, and the father or teacher allied with the mother against me—in fact, I was always surrounded by persecutors. I myself, in the role of the child, had constantly to spy on and torment the others. Often Erna herself played the child. Then the game generally ended in her escaping the persecutions (on these occasions the ‘child’ was good), becoming rich and powerful, being made a queen and taking a cruel revenge on her persecutors (Klein, 1929/1975, pp. 199-200).

In her hostility to parental intercourse Erna was characteristic of most psychoanalytic patients. Freud (1895) had recorded the impact of this on his patients from the beginning of his clinical practice, when a patient had told him “how I came by my attacks of anxiety when I was a girl…I saw my father get into bed with my mother and heard sounds that greatly excited me. It was then that my attacks came on” (p. 127). Later he described it as ‘the primal scene’, and came to regard it as a topic of universal ‘primal phantasies’ that were important sources of psychological disturbance. We can see another example in what Freud described as ‘a turning point’ in his analysis of the Rat Man (Freud, 1909d). [[35]](#endnote-35) This came after he had become very anxious about the way his free associations brought sexual and aggressive thoughts about Freud and his family. Despite Freud’s reassurances, he felt that Freud would ‘turn him out’ for reporting these thoughts. (Freud’s actual attitude seems to have been quite different: when the Rat Man (p. 287) reported imaging copulating with Freud’s daughter “by means of a stool hanging from his anus” Freud recorded this as a “wonderful anal phantasy.)

At one point he became so anxious that he got up off the couch, as if he feared remaining near Freud, and walked around the room. As Freud (1909d) recorded the episode in his notes from the time:

He agreed that his walking about the room while he was making these confessions was because he was afraid of being beaten by me. The reason he had alleged was delicacy of feeling—that he could not lie comfortably there while he was saying these dreadful things to me. Moreover, he kept hitting himself while he was making these admissions which he still found so difficult.

‘Now you'll turn me out.’ It was a question of a picture of me and my wife in bed with a dead child lying between us. He knew the origin of this. When he was a little boy (age uncertain, perhaps 5 or 6) he was lying between his father and mother and wetted the bed, upon which his father beat him and turned him out. The dead child can only be his sister Katherine, he must have gained by her death. The scene occurred, as he confirmed, after her death.

His demeanour during all this was that of a man in desperation and one who was trying to save himself from blows of terrific violence; he buried his head in his hands, rushed away, covered his face with his arm, etc. He told me that his father had a passionate temper, and then did not know what he was doing (p. 284).

The patient had previously told Freud that all his childhood he had been terribly afraid of blows, and was grateful for his father for never having beaten him, at least so far as he could remember. So it seems that in this episode he recovered a previously repressed memory—and one inconsistent with the conscious image he had previously maintained—of his father as a fearsome punisher, beating him for fouling the parental bed. The particular image that went with the Rat Man’s memory was one of Freud and his wife in bed with a dead child between them. Freud related this to his rivalry with his sister, who had died before this time. And his fears had mounted because of other images of Freud’s family that related to childbearing. In the session prior to remembering his punishment he had told Freud about imagining:

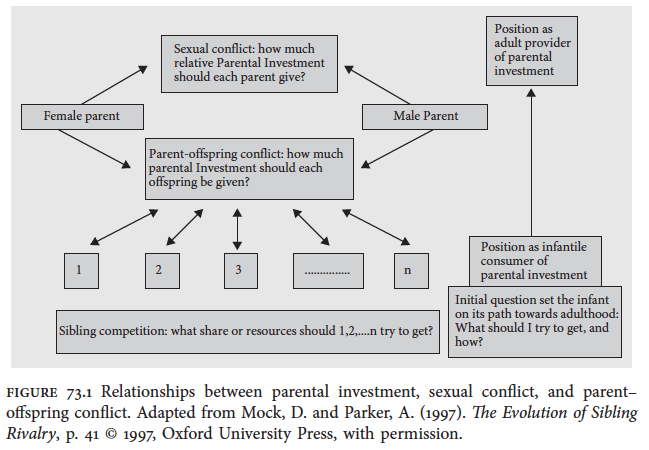
My [Freud’s] mother’s body naked. Two swords sticking into her breast (like a decoration, he said later…). The lower part of her body and especially her genitals had been eaten up by me and the children…The two swords were the Japanese ones of his dreams: marriage and copulation (p. 282-3).

This imagined attack on the mother’s organs of procreation—including special and sexualized violence (stabbing by the patient’s own swords, representing marriage and copulation) to the breast—was a variant of the anal attack the Rat Man regularly imagined on his father, with Freud and his children in place of the rats. (Or alternatively, with the Rat Man’s hostile sexual and aggressive feelings projected into them in his phantasy). This version is comparable to the hostile phantasies Klein’s little patients regularly played out, as when Erna imagined the parental couple killed and eaten, for loving and kissing one another and driving up and down all the time. Freud did not report this material in his case history, but it illustrates the kind of continuity of data and hypotheses mentioned earlier in connection with projection and projective identification in his Irma dream.

Here again, however we may suppose Freud’s hypotheses to have influenced the Rat Man, we cannot take data such as this as produced to confirm them. And in the instances we have been considering the data are related to a potentially deeper source of consilience between psychoanalysis on the one hand, and attachment and neuroscience on the other. Evolutionary biologists have come to recognize that aggressive attitudes towards parental procreation, as well as hostility towards siblings, may be predicted by Darwinian theory; and these topics have recently been discussed in terms of the interrelated notions of *parental investment*, *sexual conflict*, and *parent-offspring conflict*.[[36]](#endnote-36)

**(l) Evolutionary conflict and emotional conflict**.

Some relations among these concepts are depicted in the diagram below, which is based on that of Mock and Parker (1997, p. 41). The developmental arrow at the right has been added for the present discussion:



In considering these forms of conflict we move away from individual psychology to the very different theoretical framework of natural selection. The notions of sexual conflict and parent-offspring conflict are specified in terms of probabilities for the replications of genes. The notion of parental investment is intended to encompass the provision by a parent of anything that contributes to the thriving of a particular offspring, where this is done at a cost to the parent in contributing to the thriving of any other offspring (or at a cost to the parent’s fitness more generally). This means that parental investment coincides with whatever activities on the part of that parental genome contribute to its replication in that one child as opposed to any other, and hence to its overall effect on parental fitness as this would be measured in genetic terms. In this broad role, the genes are hypothesized to function so as to yield co-evolving pattern of adaptation and counter-adaptation that encompass both physiology and psychology, such as the conflicts around weaning that are to be observed between primate mothers and infants in several species.

So, for example, the working of these conflicts can apparently be observed from conception, in the invasion of the mother’s body by the placenta. This organ is constructed via the activity of the father’s genome to extract maternal investment on behalf of the fetus, and discounting, in accord with the abilities of fathers to invest elsewhere, other children the mother might have. The placenta has thus evolved as “a ruthless parasitic organ existing solely for the maintenance and protection of the fetus, perhaps too often to the disregard of the maternal organism.”(Hrdy (2000). p. 433). In this it bores into the mother’s blood vessels, secreting hormones that raise her blood pressure and sugars in ways that benefit the fetus but may injure her. The mother’s body, in turn, has evolved to produce hormones that counteract these; and so on. In this we can see how sexual conflict between the genes of the parents, as carried forward in countervailing physiological adaptations over many generations, takes the form of physiological conflict between a pregnant mother and her unborn child (for further discussion see Haig (1993, pp. 495-532).

The physiological investment of females in many species—and particularly in mammals—evidently outweighs that of males. By contrast with the work of a female who a carries offspring in the womb, give birth to them, and feeds them by producing milk for months afterwards, what males do, and even more what they can get away with doing, seems paltry. Even the most dedicated of human fathers often invest in their offspring by working to provide opportunities for others to provide hands- and mind-on care, and these others are often women.

Female fecundity and rate of reproduction thus sets a limit to the reproductive success of males, which the latter often try overcome by reproducing with more than one female partner. As this indicates, where the nature of parental investment systematically differs between reproductive partners, so too must many aspects of reproductive behaviour related to it—the partners’ (conscious or unconscious) strategies in courting and choosing those with whom they mate, the conditions in which they would attempt or avoid intercourse, the ways they view conception and pregnancy, their attitudes towards rearing children once they are born, and so forth.

Such differences generate sexual conflict, for they entail that different patterns of behaviour, or different motivational structures that produce such patterns, will result in the replication of a mother’s as opposed to a father’s genes (thus see Gegestand (2007), chapter 23). So if female reproduction limits that of males, we should expect males to compete for access to females, and so to advertise themselves, fight among themselves, etc., in order to obtain it. Likewise if females must incur unavoidable greater costs in investing than males, they have more to lose in indiscriminate mating, and more to gain by careful choice—say in the likely capacity for co-operation in parental investment, or again simply in the genetic quality, of those with whom they mate. So, and as in many other species, human females tend to copulate more selectively than males, at least when pregnancy is a possible outcome. This pits female selectivity against male opportunism, in the forms of sexual conflict that are still referred to as the battle of the sexes.

Part of this battle stems from the fact that there are many circumstances in which it is in the genetic interests of either member of a reproductive partnership to shift the burden of investment to the other. These are familiar source of domestic discord. Also either partner can secretly invest with someone else, and to the disadvantage of the other. This gives rise to infidelity, deceit, betrayal, and as these indicate, both men and women can shift investment to future offspring, where the future can include other reproductive partners. The means for this include the abandonment of partners and children, as practiced by men who leave to set up another family, and occasionally also by women, although in this case a reason for abandonment is often anger at the failure of the male partner to do his share.

Limitations in parental investment set the stage for sibling rivalry, which we see even in domestic pets. Newborn kittens or puppies often crowd one another out in getting to the mother’s teats, and some (‘the runt of the litter’) are disadvantaged, or even die, as a result. Likewise, as the evolutionary literature reports, some pigs are born with tusks to slash competitors for sucking, birds in the nest peck weaker siblings to death, bird parents toss superfluous nestlings away, and so on (for examples and discussion see Mock and Parker (1997) and Mock (2005)). Sand tiger sharks are particularly impressive in this respect. The female has two uteruses, and economizes parental investment by providing the fetuses in each only themselves to eat. The siblings accordingly devour each other until only a single pair remains, each safe from the other in their separate domains of conquest. After this pre-natal compression of development and learning they are born into the sea, as well-nourished and practiced predators (see Eilperin, 2012).

Parental investment and sibling rivalry take very different forms in human beings, for we are born into the seas of the family and other social groups. Our group-oriented ‘hypersocial’ species naturally shares out the burden infant care, with kin such as grandparents, uncles, aunts, and elder cousins often taking part, parents in different families exchanging help with one another, and other helpers available via other exchanges. In this as in many other things we co-operate far more extensively than other primates, who generally do not allow others even to hold their infants; and the fact that grandparents provide resources that enable their grandchildren to survive, thereby assisting the carrying of longevity-promoting genes into a third generation, may be among the causes of our increased span of life.

Still this co-operation is underlain by conflict. In hard times—as seem often to have obtained in human history—the disposal of one child may be an important means to ensuring the survival, or alternatively the later conception, of others. This gives rise to abortion, infanticide, orphanage and other kinds of abandonment, as well as many forms of selective neglect. These practices reflect parent-offspring conflict—conflict between the interests of the genes of parents, as opposed to those of their offspring, who may be neglected, abandoned, or killed.

Although we tend steadily to ignore the possibility of such conflict, it is often not far from the surface. The demands of feeding and caring for a baby are so great that they cannot be met by a lone mother, or even by a single couple, in the absence of help from others. Given the precariousness of motherhood, these seem to be alternatives that people who live by hunting and gathering, or near subsistence levels for other reasons, must often have to consider; and they seem to have a natural place in maternal psychology. Even in contemporary affluent societies the number of babies abandoned, or left anonymously at hospitals or orphanages, is liable to increase with unemployment or recession. Sara Blaffer Hrdy has long stressed the evolutionary importance for babies of being able to evoke love and care (see Hrdy (2000, 2009), and I have been urging the importance of their also being able to coerce it by rage, pain, and the infliction of anxiety, guilt, and remorse. From the perspective of the infant, securing parental investment is in part a continual matter of life and death.

Like sexual conflict, parent-offspring conflict seems intrinsic to sexual reproduction. Evolution prepares infants to secure a maximum of parental investment for themselves, as was illustrated by the way infants’ early natural expressions of emotion elicit investment via both affectionate cooperation and angry coercion. But evolution also adapts parents to apportion investment over more than one offspring, lest their genotypes pass less than a single copy into the next generation. So newborns seem fated naturally to seek more in the way of parental investment than parents are naturally prepared to give—and at the expense of siblings, whether actual or only potential.

A newborn’s parents are also subject to sexual conflict, even from shortly after birth. The genetic interests of a father are likely to be served by getting the mother pregnant again, since males in general have been able easily to invest elsewhere. By contrast the genetic interests of a mother—her body having been given over to housing this particular infant during months of prenatal development, the resources for which have been provided at physiological loss to herself, and then gone through the wear and tear of giving birth—are likely to be best served by getting this particular and already costly infant well established, and allowing her body to recover and repair itself; and this would be better for this particular infant as well.

In this evolution has cast its lot with the interests of newborn infants and their mothers, by binding them in the relationship of nursing. This activity is contraceptive, and so aligns the genetic interests of mother and baby against those of the father, at least until after the baby is weaned. This, however, means that by sucking at the breast – beginning the first and most formative of its emotional relationships, and one that is both pleasurable and life-giving – the infant perforce casts itself as the mother’s ally, and the father’s opponent, in sexual conflict; and likewise that by nursing and sustaining her infant, the mother becomes its ally in preventing the conception of rival siblings. (On the role of nursing, and such factors as intensity of nursing and metabolic load see Ellison (2001), particularly chapter 4).

We have seen that the infant’s use of incompatible emotions in securing parental investment early in life naturally puts it at risk of later emotional conflict; but emotions related to affection on the one hand, and hostility on the other, would seem to unite in opposition to the production of rivals. Infants (and little children) stand to increase their share of parental investment by using their abilities to engage their parents affectionately, or again to coerce them by rage, fear, or SPG, in a single simple way—that is, in *any emotional or other manipulation that makes it less likely that the parents will conceive another child*. Any such disposition to limit further parental reproduction would apparently render infants more likely to secure parental investment for themselves, and so more likely to reproduce in their turn, and so to perpetuate that disposition together with others of the same kind.

These dispositions would be continuous with, and successors of, the conception-preventing rivalry with both the father and potential siblings that infants enact in nursing at the breast. Freud regarded nursing as part of establishing “the first and strongest love-object and as the prototype of all later love-relations—for both sexes” (Freud, 1940a[1938], p. 188). Darwinian theory, it seems, obliges us also to recognize it as also the first prototype of unknowing engagement in sexual, parent-offspring, and sibling conflict.

Reflecting on parent-offspring Trivers remarked that “all the machinations Freud imagined going on in early life had a reality…which I had formerly disbelieved…” (cited in Hrdy, 2000, p. 430) and he was later to develop an account of self-knowledge according to which we systematically deceive ourselves about our own desires and intentions in order better to deceive others. Yet despite the findings of attachment research neither he nor other evolutionary psychologists have faced the implications of this idea—and the kind of early formative, and pervasive suppression of self-understanding that might be involved—in the context of the first year of life. If Trivers had considered that the attitudes that the infant had naturally to suppress in order to deceive others might include those involving the direction sensual affection, as well as RAGE, FEAR, and SPG towards the mother and father during the first year of life, his account might well have resembled the psychoanalytic ones we have been considering.

So I think that taking explicit account of these evolutionary conflicts may enable us to better to understand why the infant’s relation to the mother at the breast is regarded as the inception of the developments that Freud described in terms of the Oedipus complex, and also the far-reaching significance that these have in human life. There is good reason to hold that infants have precursors of adult sexual experience (In addition to their observable oral and anal pleasures, male babies are capable of erection, females of vaginal lubrication, and both of what seems to be orgasm without ejaculation)(Gray, 2013). But the development of the cortex seems to combine and distribute the basics of motivation over the whole range our actions and projects, and in such a way that assigning an intrinsically sexual or non-sexual nature to any activity or experience becomes at best a matter of degree.

Freud was one of the first to draw attention to the spreading and blending of sexual significance, in the form of sexual symbolism, which as noted above can often be understood as conceptual metaphor.[[37]](#endnote-37) It has been made clearer by work in evolutionary psychology, which indicates how much of everyday life involves the signalling of information (or again forms of false advertising) relevant to procreation (see for example Seabright, 2012, chapter 3). But the same spreading means that the deeper importance of sensual experience in nursing and attachment pertain to a very wide range of effects throughout infants’ more general dispositions to affection and co-operation, as opposed to hostility and conflict, as these develop over the course of life in our ultrasocial, group-co-operative, and often violently group-conflicting species.

As the arrow inserted at the right of the diagram above illustrates, we can see individual development as involving a transition from infantile to adult positions in respect of parental investment and sexual and parent-offspring conflict. Although the infant may start postnatal as a thoughtless placenta-like extractor of parental investment on its own behalf, and regardless of others, this situation changes very rapidly with development. By the end of the first year—and via the steps sketched in section 6(b) above—it has become a fully conscious, co-operative, thinking, and soon-to-be-speaking member of a family, whose aggression has already come to be regulated in interactions with its mother or other carers. Regulation of this kind will enable infants, as Tremblay says, to ‘learn not to aggress’ (unduly) in later childhood, and so to negotiate later sexual and other conflicts to become mature and relatively unselfish providers of parental investment to children of their own.

From the perspective of both evolution and attachment, this seems one of the most significant of human psychological developments. This in turn suggests that we should consider how the infant’s early experiences of parental investment, sexual conflict, and sibling rivalry are used during development to prepare it for later conflicts of the same kinds—and hence for conscious choices not just about killing or stealing but also about truth and realism as opposed to phantasy and deception in courting, in what circumstances and with whom to have sex, when and with whom to seek or risk conception, and whether and how the needs of children will be met.

Choices of these kinds involve the moral conflicts that Freud took to be regulated by the superego/ego-ideal, and so by guilt and shame; and his analysis of his dream, like Saks’ experience of psychosis, enable us to see something of the internal working of this regulation, and how it extends beyond the family. Even the few associations we considered above provide a glimpse as to how Freud’s feelings about his own daughters were extended to his patients and fiends outside the family, and others show the same for the rivalries he experienced in childhood. So we see small but real mental particulars of the working not only of projection as this imaginarily dissociates Freud from Otto, but also of identification (this Mathilde with that Mathilde) as this linked members of morally comparable groups (children and patients) in Freud’s unconscious mind.

As this indicates, the infant’s development from consumer to provider of parental investment is also one of moral character;[[38]](#endnote-38) and the same range of conflicts that determine madness or sanity (as shown in the material from Saks above) are also those with which morality is concerned (and one of the most striking parts of Saks’ disorder was her imaginary fascination with killing babies, as apparently derived from early sibling rivalry). If the line of thought we have been following is correct, all these conflicts, sexual, emotional and moral, are inescapable consequences (but ones we can work to alter and mitigate) of our evolutionary heritage.

This whole topic remains to be scientifically explored. But can see something more of the nature and scope of these conflicts by using further concepts from evolutionary and social psychology. In these terms infantile experience is a formative stating point both:

1. For what will become sympathetic male-with-female co-operation in courtship, mating, and childrearing on the one hand, and what will become antipathetic male-against-male and female-against-female competition in these same activities on the other, and also, at the same time;
2. For what will become sympathetic ingroup-with-ingroup co-operation (family with family, kin-group with kin-group, tribe with tribe, etc.) on the one hand, and what will become antipathetic ingroup-against-outgroup competition and conflict (family against family, kin-group against kin-group, tribe against tribe, and nation against nation) on the other.

In (ii) the mother-infant couple is taken as the first of a series of nested ingroups, and the father the first of many potentially alien outgroup figures—to be rapidly succeeded by strangers at 7 months—that the infant will encounter as it extends its horizons to the rest of the family and then beyond. Darwin and many of his successors have taken the co-operative and competitive activities of tribes with tribes as important drivers of a process that combines natural selection with social or cultural evolution (for a recent discussion see Mesoudi, 2011). Still the human fusion of (i) and (ii) should be as evident as the fact that adolescent male muscular strength is as often devoted to forms of group conflict (real or imaginary gangs, team sports, etc.) as it is to individual sexual competition, and that effectiveness in such activities is often registered in courting. And as in the other cases we have considered, this familiar feature of human life goes deep into our psychobiological as well as our social nature—here, perhaps, into a genetically prepared lateralization in the cortical elaboration of RAGE that may distinguish adolescent male from female brains, and may in our present cultural circumstances also be related to ‘mental disorders most frequent in adolescent males (i.e., conduct disorder: see Schneider, et al., 2011).

At present such topics, and others linked in (i) and (ii), are studied in fragmentary ways across the human sciences. Psychoanalysis connects and unifies them, and it does so by linking them directly with psychological processes that we can see clearly in individual cases, understand in near-commonsense terms, and extend in the ways we have been considering. Thus we can study the working of identification and projection in ideographic commonsense detail in examples like Freud’s dream, or again in experimental conditions like those of the homophobic men discussed above, or via possible physiological mechanisms such as mirror neurons.

These mechanisms, as preliminarily specified Freud and his successors, enable us better to understand the regulation of affection and aggression in the family, and the extension of this to successively larger co-operating or competing groups. Thus the regulation of aggression within the family is developmentally rooted in the infant’s ability so to identify itself and its mother to come to represent itself and her as anatomically and psychologically coherent individuals in a co-operative relationship; and as we have seen, the formation of this first mother-infant *good us* goes with the development of fear of strangers as imaginary *bad them.*[[39]](#endnote-39)

**7. Prospects.**

An interesting range of these phenomena are caught in a proverb that has many versions:

Myself against my brother

My brother and I against the family

My family against the clan

All of us against the foreigner

This represents sibling rivalry and parent-offspring conflict as in (i) and (ii) above, that is, as part of a larger pattern of co-operating to compete sustained by the dialectic of identification and projection so as encompass successively larger co-operating and competing groups. Hypothesizing such a structure, even in this simple schematic way, may help us in understanding how we have come to be as we are, and also some of the difficulties we seem clearly to face. Insofar as we naturally employ identification and projection in this way, we cannot mobilize identification in the service of co-operating as a single non-competing group—the human species—even when very common interests (removing the threat of nuclear weapons, seriously mitigating global warming) would be served by doing so.

Insofar as this suggests an explanation of our situation, we should surely investigate it. Since such an investigation would concern how emotional conflicts within individuals drive social conflicts of many different kinds, it might offer a prospect of scientific unification that was individual and social as well.

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1. Here it may be worth noting that since H and not-H are contradictory, P(H and not-H) = 0 and P(H or not-H) = 1. This being so, P(H) = 1 – P(not-H), and so approaches 1 as P(not-H) approaches 0, and vice versa. This makes clear, as we should expect, that whatever D confirm H thereby disconfirms not-H and vice-versa. This is also indicated by taking not-H as the hypothesis under investigation (as of course it is whenever H is) and the evidence as not-D. This transforms the predictive condition of probabilistic relevance for H by D [P(D given H) > P(D given not-H)] into the predictive condition for not-H by not-e [P(not-D given not-H) > P(not-D given H)]. [↑](#endnote-ref-1)
2. This image is gratefully reproduced from the Wikimedia commons, as described at <http://en.wikipedia.org/wiki/File:Belon_Oyseaux.jpg>. [↑](#endnote-ref-2)
3. Thus Darwin (1903) wrote “I have always looked at the doctrine of natural selection as an hypothesis, which if it explained several large classes of facts, would deserve to be ranked as a theory deserving acceptance” (pp. 139-140); and on the role of probability: “Mere chance ... alone [i.e., probability taken in the absence of the causal mechanisms he had hypothesized] would never account for so habitual and large an amount of difference as that between varieties of the same species” (Darwin, 1859, p. 111). [↑](#endnote-ref-3)
4. This website illustrates both the scope of Darwin’s account and, at the level of particular species, some of the many divergent hypotheses that it encompasses. So for example there have been many disputes about the evolutionary lineage of *homo sapiens*. Compare the tree of life on homo sapiens with Lordkipanidze et al. (2013). [↑](#endnote-ref-4)
5. Thus for example Jung’s ‘compensation’ as defined in rebellious opposition to Freud’s account of wishfulfilment, appears on inspection to be almost indistinguishable from that notion, particularly in empirical consequences. (There is little difference between saying that in the dream of Irma’s injection Freud nocturnally compensates his annoyance at Otto by the experience of dreaming that Otto has given Irma a thoughtless dirty injection of trimethelamin and saying that he fulfils his nocturnal wishes in doing so.) The same applies to more global disputes. Thus while all schools emphasize the role of aggression, conflict about aggression, and aggression turned against the self, followers of Klein argue that infantile aggression is an innate expression of a drive, whereas followers of Kohut hold that infantile narcissism means that narcissistic rage is easily aroused in an infant. So disagreement becomes crystallized around clinically irresoluable verbal differences—whether infants are innately aggressive, or innately exclusively concerned with themselves, and so liable to be aggressive—that have closely similar observable consequences. Among groups that are in regular communication—such as followers of Freud, Klein, Winnicott, and Jung in London—there is a sense of general clinical agreement, fostered by each school’s ability to understand its concepts in terms of the others’. For a Jungian note about Jung in this connection see http://www.thesap.org.uk/michael-fordham. [↑](#endnote-ref-5)
6. As in the case of Darwin, one may wonder how Popper can accept explanations in a theory he is discussing as confirmed ‘beyond reasonable doubt’, without withdrawing his claim that the theory does not really explain and cannot really be confirmed. Grünbaum (1989) reasonably criticises Popper for inconsistency on this point, and I am inclined to think of his incoherence as follows:

   From the beginning of his work Popper focussed on the fact that open generalizations like ‘All Swans are white’ could be conclusively falsified, but never conclusively verified, by observation. At first he took this to mean that we could never confirm, but could only falsify, such statements. But it seemed inadequate to hold that we could never have reasons for accepting general beliefs or theories, but only for rejecting them. So, consistently with his fixation on conclusive falsification, Popper held that instances that *had they been different would have falsified* a belief or theory could also be taken to confirm it. (Taking the account we have been using this is like thinking that since P(not-H given not-D) approaches 1 as P(D given H) does, the latter is the *only right condition* in which to hold that P(H given D) > P(H)—although if one is not so focussed on conclusive falsification, this is an arbitrary restriction on the more general [P(H given D) > P(H) if and only if P(D given H) > P(D given not-H)] mandated by Bayes’ theorem.)

   This restricted account enabled Popper to accept confirmation of instances of ‘All swans are white’, and hence for the kind of strict generalizations he favoured. Still he provided no account of confirmation or disconfirmation for the particular *instances* on which such generalizations are based—no account, that is, of the way in which we confirm or disconfirm ‘This is a swan and it is white, in the case of ‘All swans are white’. This vacancy where the foundations of his account should have been left Popper free open-mindedly to accept as confirmed individual instances of whatever explanations he appreciated, such as Freud’s explanations of particular dreams, or Darwinian explanations of the adaptation of particular populations of bacteria to penicillin.

   But then Popper could hold, consistently with his account, that Freudian or Darwinian *generalizations* from these cases remained unable ‘*really* to predict’ and so ‘*really* to explain’, despite the cases he accepted. Here his use of ‘really’ could be seen as indicating that P(D given H) approaching 1 was required for ‘real’ prediction or explanation. He could have dispensed with such verbal manoeuvres by abandoning his criterion of conclusive falsifiability in favour of the more flexible Bayesian account, and could have applied this to observational data as well. But although many of his followers seem to have done this, Popper himself did not. [↑](#endnote-ref-6)
7. The fullest treatments are in Hopkins (1999a), but see also Hopkins (1996, 1999b) where the role of wishfulfilment in Freud’s work more generally is sketched out; Hopkins (2012) where the role of wishfulfilment is compared with projection and integrated, together with repression and the superego, into Friston’s Freud-like ‘free energy’ neuroscience; Hopkins (2013) in which Freudian claims are discussed in terms of the Bayesian sketch above; and Hopkins (2013) where implications of this for psychiatry are discussed. These and other papers are also available online at jimhopkins.org. [↑](#endnote-ref-7)
8. I speculatively traced how this practice might have evolved in Hopkins (2000). [↑](#endnote-ref-8)
9. As Coren (1998) reports, two men known to have endured long-term sleep deprivation voluntarily, Randy Gardner and Peter Tripp, both developed paranoid symptoms, despite (probably) getting short unobserved bits of sleep during their periods of deprivation. [↑](#endnote-ref-9)
10. On consolidation see also among others Payne (2011; especially Fig 1 p. 273); Lewis & Durrant, (2011); Dudai (2012); Inostroza & Born (2013). On preparation for future activity see also van Dongen et al. (2013); Diekelmann, Wilhelm, Wagner, & Born, (2013). [↑](#endnote-ref-10)
11. The Neurocritic, <http://neurocritic.blogspot.co.uk/2011/09/neurophysiology-of-pain-during-rem.html> See also the articles cited in this blog entry, particularly Bastuji et al. (2012). As the Neurocritic reports, this would seem to be just the kind of functional dissociation required to protect sleep, since their effect was that activity “decreased dramatically in the cingulate. Recall that the medial mid-anterior cingulate cortex (ACC) is associated with the attentional and affective components of pain, while the lateral opercular and insular cortices are more related to the sensory aspects of pain. The authors suggest that this dissociation between the lateral and medial pain systems is what allows the experience of pain in dreams without being alerted enough to wake up.” [↑](#endnote-ref-11)
12. Thus Howson and Urbach (1989) explain how in this context only a few data presenting what Bayesians sometimes ‘suspicious coincidences’ can give powerful support to causal hypotheses predicting them.

    …The distinguished scientist, Charles Babbage, examined numerous logarithmic tables published over two centuries in various parts of the world. He was interested in whether they were derived from the same source, or had been worked out independently. Babbage (1827) found the same six errors in all but two, and drew the ‘irresistible’ conclusion that, apart from these two, all the tables originated in a common source…In fact scientists seem to regard a few shared mistakes in different mathematical tables as so strongly indicative of a common source that at least one compiler of such tables attempted to protect his copyright by deliberately incorporating three minor errors as ‘a trap for would-be plagiarists’… (p. 87).

    The same principle is frequently used in neuroscience (e.g., to establish conclusions about causal relations between non-coincidental patterns of neural firing by means of a data coming from a small number of implanted electrodes). [↑](#endnote-ref-12)
13. This hypothesis would be sharpened by considering that the sexual ‘solution’ to Irma’s problems that Freud blames Irma for not accepting at the beginning of the dream and the toxic sexual solution thoughtlessly injected by Otto into Irma at the end of the dream were linked in his mind. As he explained later in a letter to Karl Abraham, he understood the dream as also expressing his own sexual desires: “there would be one therapy for widowhood…all sorts of intimate things, naturally.” (REF) This may also have reflected his unconscious feelings about his own therapeutic practice, which was focussed on sexuality at the time. [↑](#endnote-ref-13)
14. And here as in the case of ‘solution’ above the dream expresses deep emotional connections by the use of the same word (‘solution’/’solution’, ‘Mathilde/’Mathilde’). [↑](#endnote-ref-14)
15. For recent work on dehumanization, and on sexual prejudice, see Haslam and Loughnan (2014, advance online posting) and Herek and McLemore (2013). The mechanisms discussed in these essays are compatible with the use of ingroup-idealizing and outgroup-denegrating projection, as described in the text, and in the essays cited below. [↑](#endnote-ref-15)
16. I have discussed this further in Hopkins (2013b). For recent discussion of further similar examples see, for example, Maltsberger (2008). [↑](#endnote-ref-16)
17. There is a fuller account of this, as well as citations to the quotations above, in Hopkins (1988). [↑](#endnote-ref-17)
18. The whole field of developmental psychology from infancy, including parts of psychoanalysis, is reviewed in Bornstein (2014, advance electronic publication). A good overall recent account of work in attachment, from infancy over the lifespan, is Howe (2011), which can be consulted on almost all the topic discussed in the text. For more detailed (but not quite so up-to-date) information and citation of sources see Cassidy and Shaver (2008). There are now reasonably good introductory materials on attachment on Wikipaedia, including <http://en.wikipedia.org/wiki/John_Bowlby> and <http://en.wikipedia.org/wiki/Attachment_in_children>. As regards psychoanalysis and infancy Kenny (2013) seeks to integrate a range of materials from psychoanalysis, developmental psychology (including attachment), and neuroscience. See particularly the discussion ‘Integration of neuroscience, psychoanalysis, and attachment theory’ (pp. 251ff). For discussion of psychoanalysis and attachment generally see Fonagy (2000) and Fonagy, Gergely, and Target (2008). There is now a vast literature on attachment, neuroscience, and psychotherapy. For a recent overview of his own work see Schore (2012); see also Hart (2008), as well as the text below. In what follows, however, we will be linking attachment with psychoanalysis and neuroscience via the notion of a cortical ego in relation to a subcortical id or family of basic drives or generators of motivation as developed in the work discussed and noted below. I think this provides the neuroscientific context that best integrates attachment and psychoanalysis. [↑](#endnote-ref-18)
19. For Bowlby’s conception see Bretherto and Mullholand, (2008).For contemporary neuroscience see below. [↑](#endnote-ref-19)
20. Ribble’s (1944) abstract describes her pioneering work as:

    A Freudian analysis of the significance of infantile experience in the formation of personality is followed by a discussion of direct observations in this area, most of it based on unpublished studies by the author. Important topics deal with the child's emotional relation to the mother, oral experiences, the effect of experiences related to elimination, and experiences related to affectional needs. There is a brief review of related studies of animals. [↑](#endnote-ref-20)
21. The main non-interpretive evidence for this is an experiment performed by Thomas Bower, (Bower,1977). He describes:

    A simple optical arrangement that allows one to present infants with multiple images of a single object … If one presents the infant with multiple images of its mother—say three ‘mothers’—the infant of less than five months is not disturbed at all but will in fact interact with all three ‘mothers’ in turn. If the setup provides one mother and two strangers, the infant will preferentially interact with its mother and still show no signs of disturbance. However, past the age of 5 months (after the co-ordination of place and movement) the sight of three ‘mothers’ becomes very disturbing to the infant. At this same age a setup of one mother and two strangers has no effect. I would contend that this in fact shows that the young infant (less than five months old) thinks it has a multiplicity of mothers, whereas the older infant knows it has only one (p. 217).

    There is also some evidence from more recent eye-tracking studies: see Bertenthal, Gredeback, and Boyer, (2012). [↑](#endnote-ref-21)
22. For more information about Adult Attachment Interview (AAI) see for example <http://www.psychology.sunysb.edu/attachment/measures/content/aai_interview.pdf> and Hesse (2000, 2008). For an in-depth study see Steele and Steele (2008). [↑](#endnote-ref-22)
23. Phrases in the discussion and the first table are taken from Howe (2011, pp 48-49); Solomon and George (2000); Hesse (2000, table 19.2, p. 399), and Hesse (2008, tables 25.3 and 25.4, pp. 568-569). Data about disorganization and 3 + year development of disorganized coercive strategy from Solomon and George (2000, table 14.3), and Lyons-Ruth and Jacobovitz (2008, particularly pp. 681-685. The final table is taken from Howe (2011, p. 49). [↑](#endnote-ref-23)
24. On genetic factors see Howe (2011, chapter 14); van Ijzendoorn (1995); Lyons-Ruth and Jacobovitz, (2008, particularly 681-685). Recent results, not yet consolidated, suggest that although the distributions among categories remain stable as measured at different periods of life, in the case of individuals the strong early influence of experience with the mother may tend to give way to genetic or epigenetic factors over time. It may well be, as in the case of language, that evolution prepares the infant to learn as much as possible about currently useful modes of coping by identifying with relevant persons in the environment; but then for emotion and motivation also permits genetic or epigenetic factors to reassert themselves over time. [↑](#endnote-ref-24)
25. With the discovery of mirror neurons and other neurological mechanisms that may enable identification, the notion has come generally to be assigned the kind of importance in development that it originally had in Freud. See Rizzolatti & Sinigaglia (2010), and Gallese, (2009). [↑](#endnote-ref-25)
26. See the section on Anna Freud and identification with the aggressor at <http://en.wikipedia.org/wiki/Identification_(psychology>) [↑](#endnote-ref-26)
27. On the unlearned and early-developing nature of the facial expression of emotion see Matusomoto (2009) and Reissland, Francis, Mason, and Lincoln (2011). For face-to-face salience and imitability see Wang, Ramsey, and Hamilton (2011). New research reveals more about how the brain processes facial expressions and emotion. [↑](#endnote-ref-27)
28. The general idea of a cortical ego, as developing to regulate subcortical drives or sources of excitation, as well as associated claims about cortical secondary and subcortical primary processes, was advanced independently by Richard Carhart-Harris and Karl Friston (Carhart-Harris & Friston, 2010), and by Mark Solms and Jaak Panksepp (Solms & Panksepp, 2012), and has recently been espoused by Rizzolatti, Semi, and Fabbri-Destro (2013).

    Carhart-Harris and Friston presented a range of Freud’s theories, originally cast in terms of a conception of free energy partly isomorphic to Friston’s, as consilient both with Frison’s overall program, and with a large range of data drawn from neuropsychology, neuroimaging, and psychopharmacology. I followed this in Hopkins (2012), developing a Bayesian account of repression and the superego, and again in connection with psychiatry and neuroscience in Hopkins (2013). These papers provide more detailed discussion of some of ideas in this essay. [↑](#endnote-ref-28)
29. For Panksepp’s most detailed discussion and delineation of these systems, which contains many subtleties not reflected in this telegraphic discussion, see Panksepp (1998). This work has recently been updated and presented for general readers and therapists in Bivens and Panksepp (2011)and celebrated and discussed in a special edition of *Neuroscience and Biobehavioral Reviews* (vol. 35, Issue 9, pp. 1789-2044; October 2011). [↑](#endnote-ref-29)
30. For discussion of the idea that both motivated behaviour and the conscious experience that accompanies and regulates it originate in the same subcortical regions and via the same or closely co-ordinated mechanisms see Damasio, Damasio and Traniel (2012); Solmsand Panksepp (2012); and Solms (2013), with replies by a range of neuroscientists and others such as my ‘Repression creates an unconscious id’ (Hopkins, 2013). The claims by Damasio, Panksepp, and Solms about the role of the cortex are assessed in the perspective of the Helmholtz/Bayes neuroscience discussed below, which places greater emphasis on top-down cortical processing, in Gu, Hof, Friston, and Fan (2013). Their claims about the cortex, as well as the work on the insula by Craig that they cite, seem to me to be consistent with the overall picture of subcortical generation and cortical elaboration they are discussing. [↑](#endnote-ref-30)
31. See Lindquist, Wager, Kober, Bliss-Moreau, and Barrett (2012), for a ‘psychological construction’ account emphasizing the cortex. They contrast their view with Panksepp’s by saying (p. 138) that:

    A locationist approach has linked the PAG to distinct circuits corresponding to several emotion categories: rage, fear, joy, distress, love and lust (Panksepp 1998). In a psychological construction approach, the assumption is that a given dedicated circuit for a specific behavioral adaptation (e.g., withdrawal) will be active across a range of emotion categories (e.g., a person can withdraw in instances of both fear and anger), and different dedicated circuits within the PAG (e.g., fight, flight) will be active within instances of a single emotion category depending upon which behavioral adaptation is more relevant for the immediate context.

    This, however, is quite consistent with the role Panksepp assigns to the cortex in constructing the more complex ‘tertiary’ emotions required for human social life. See, for example, Panksepp and Biven (2012, p. 16, Fig. 1.6). [↑](#endnote-ref-31)
32. The regulation of infantile anger in relation to the mother is discussed in more detail in Hopkins (1987) and related to neuroscience in Hopkins (2012). [↑](#endnote-ref-32)
33. This and the following quotation are from Freud’s notes from the first seven sessions, which were not published in the *Standard Edition* because they were reproduced almost verbatim in the case history. They were published in Hawelka and Hawelka (1974). [↑](#endnote-ref-33)
34. Here the relations of the parental couple are expressed in a familiar metaphorical, structure, in which being together in a vehicle represents being in a relationship, and the fate of the vehicle and of the relationship go together. For example the relationship may be *taking off* (airplane); *on the rocks* (boat); *off the rails* (train); or again *in the slow lane*, *at a crossroads*, *stalled*, *stuck*, or *at a dead end* (car). Taking a lyric from a popular song, we recognize instantly that in singing ‘we’re driving on the fast lane in the freeway of love’ the singer is referring to a relationship that is exciting, risky, etc. This is the same system of metaphor that the little girl is naturally using, in representing the couple as loving and kissing one another and ‘driving up and down all the time’. The relation of psychoanalytic symbolism to conceptual metaphor—another consilience with cognitive science—is discussed in more detail in Hopkins (2000). There I emphasize the metaphor of the mind as a container. This is relevant both to projective identification in general and to the fate of Freud’s ‘solution’ in the Irma dream. [↑](#endnote-ref-34)
35. This case as well as the dream of Irma’s injection considered in detail below is discussed in the context of a fuller account of the superego, ego, and id in terms of Bayesian neuroscience in Hopkins (2012) and in connection with psychiatry and neuroscience in Hopkins (2013). It is worth noting that Freud’s (1909d) description of the ‘turning point’ in his case history at pp 205ff can very usefully be compared with his much fuller description of the episode in his own notes at 281ff (The crucial ‘he agreed that his walking about the room while making these confessions…’ appears at 283). It appears from Freud’s notes that the punishment the rat man remembered was not, as Freud had hypothesized, a result of masturbation, but rather for something that could be regarded as much more specifically Freudian, but upon which Freud was not focussing at the time. The actual punishment was for a symbolic attack on the parents and their sexual intercourse, and enacted by the child’s lying between the parents and peeing in the parental bed. And the Rat Man’s feeling about this were reflected in his imagining Freud and his wife with a dead baby lying between them. As noted below, the Rat Man’s memory of this attack and the punishment it produced were preceded by expressions of destructive hostility to Freud’s mother that are readily understood as projected versions of his own. So it appears that this episode should be understood in terms of the deeper issues of parent-offspring conflict and sibling rivalry considered later in the text.

    [↑](#endnote-ref-35)
36. Robert Trivers’ pioneering essays on these topics are in Trivers (2002): see particularly ‘Parental Investment and Reproductive Success’ and ‘Parent-Offspring Conflict’. The latter is linked in detail with sexual conflict in Mockand Parker (1997) and both are illuminatingly discussed in Hrdy (2000). The linked topics of parental investment and parent-offspring conflict related briefly to psychoanalysis in Hopkins (2003) and (2004). [↑](#endnote-ref-36)
37. See note above, and consider also the sexual ‘solution’ first proposed to Irma by Freud, then physically injected into her by Otto. In this the dream draws on the network of conceptual metaphor that relates mental to physical concepts via the metaphor of the mind as a container. [↑](#endnote-ref-37)
38. This is also why considering parental investment and sexual and parent-offspring conflict have led evolutionary theorists to argue that the genetic interests of offspring would best be served by what they describe as ‘true monogamy’ (Mock & Parker, 1997, p. 222), which corresponds to the human moral ideal of lifelong faithful marriage centred on the rearing of children. [↑](#endnote-ref-38)
39. This is discussed in more detail in Hopkins (1987) and in relation to neuroscience and the gene-culture evolution mentioned above in Hopkins (2003, 2004). [↑](#endnote-ref-39)