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## LONG ARTICLE

### Consciousness studies and evolutionary biology in Stoppard's ›The Hard Problem‹

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*At the Royal National Theatre Platform Performance with Tom Stoppard on 6 February 2015, host Nicholas Hytner, then still director of the RNT, started the conversation by quoting from a letter Stoppard had sent Hytner in 2013 (Hytner 2015). In the letter, Stoppard indicates that he wanted to combine writing about the banking crisis and the possibility of a person's altruistic goodness in the context of evolutionary biology (Hytner 2015). The resulting play, ›The Hard Problem‹ (2015) directed by Hytner at the Dorfman Theatre (World Premiere on 28 January 2015), was at the centre of that platform discussion, and is at the centre of this article. In the article we provide a detailed analysis of the play's use of references to evolutionary biology and consciousness studies, and how these references relate to the characters, the plot, and the RNT production.*

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#### Introduction

At the Royal National Theatre Platform (RNT) Performance with Tom Stoppard on 6 February 2015, host Nicholas Hytner, then still director of the RNT, started the conversation by quoting from a letter Stoppard had sent Hytner in 2013 (Hytner 2015). In the letter, Stoppard indicates that he wanted to combine writing about the banking crisis and the possibility of a person's altruistic goodness in the context of evolutionary biology (Stoppard 2015). The resulting play, *The Hard Problem* (Stoppard 2015) directed by Hytner at the Dorfman Theatre (World Premiere on 28 January 2015), was at the centre of that platform discussion, and is at the centre of this article. It was Stoppard's first stage play since 2006, and the first play for the National Theatre since 2002. The new play by

one of the leading playwrights in the UK and the world thus came with high expectations, and critical reception showed some disappointment. Susannah Clapp, for example, writes in *The Observer*:

The joy of the play, his first for nine years, is that it brings this problem to the stage and poses it crisply. The difficulty is that Stoppard then glides away from examining it. Often taxed with being too intellectual as a playwright, he is here not intellectually stringent enough. The great adventurer looks strangely conventional. (Clapp 2015)

In the article we provide an analysis of the play's use of references to evolutionary biology and consciousness studies, and how these references relate to the characters, the plot, and the NT production.

Stoppard has been well-known for using complicated intellectual concepts and frameworks in his plays. He plays with existentialism in *Rosencrantz and Guildenstern Are Dead* (1966), in *Arcadia* (1993) there are chaos theory and thermodynamics, as well as various distinct philosophical positions, which are also at the centre of *Jumpers*. Quantum mechanics is central to *Hapgood* (1988). In each of these cases, Stoppard works with a relatively well established framework. Those frameworks are complex, and within those frameworks there may be different opinions on detail, but the frameworks represent known and accepted paradigms, philosophical schools or approaches. The plays take up those frameworks, and the plays' wit and intellectual brilliance are caused by the characters challenging common sense opinions of life against the backgrounds of the frameworks. Stoppard's approach is successful because he can assume a certain level of familiarity of the audience with the frameworks. On that basis of familiarity Stoppard adds further factual information and crafts the challenges.

The same is true for Stoppard's focus on evolutionary biology in *The Hard Problem*. Evolutionary biology may be controversial, in so far that some people agree with its tenets and others do not, but in itself it consists of a range of related insights about life on this planet, including human life. It is these tenets that Stoppard teases out in *The Hard Problem*, and in that respect this play is no different from the others. The next few paragraphs therefore discuss the play from the context of evolutionary biology.

### ***The Hard Problem and Evolutionary Biology***

To start with, evolutionary biology works with averages, with typical events, the norm, and, as any kind of science, does not like »outliers«, data that do not meet this criterion of average. In line with this tenet, the play's characters cannot be extraordinary, and they are not.

At the beginning of the play, the main character, Hilary Matthews, is a 3<sup>rd</sup> year student of Psychology at Loughborough University. We learn later that she had a baby at the age of fifteen and dropped out of school as a result, giving the baby, a girl she named Catherine, up for adoption. Because of these circumstances it is likely that Hilary is a mature student, a little older than the typical age of 20-21 for a 3<sup>rd</sup> year student. Readers and audiences have to work this out for themselves—a device characteristic of the entire play: to get to its depths, the depths from which the writing originated, we have to work. In the play's first scene, Hilary is in her bedsit with her tutor, slightly older Spike, who has agreed to give her a lift to her home to offer a private tutorial, and to see whether he cannot only get into »her good graces«, as he puts it, that way, but also into her bed — he can. Hilary seems hesitant about »the biology«, as Spike puts it (Stoppard 2015: 6),

at first: »I'd rather not complicate...« (Stoppard 2015: 6), but Spike's response makes her laugh: »Hey, I'm your tutor, it would be an abuse of trust without precedent in higher education« (Stoppard 2015: 6). This line also created the loudest laugh from the audience at the matinee performance on 2 May 2015. It was an open, genuine kind of laughter, in response to a line in the opening minutes of the play, when the context was being established. Hilary has been applying for research posts to start after her graduation, and has been successful in obtaining an interview at the Krohl Institute for Brain Science, where she had had least hopes, and had applied only »for sheer cheek« (Stoppard 2015: 12). She is aware that she needs a miracle for her interview to be successful (Stoppard 2015: 16), also given that she will graduate with a II.1, which, in the UK higher education system, is not the highest category. While her university, Loughborough, has a good reputation, it is not in the first rate category of Oxford and Cambridge in the UK, or CalTech (California Institute of Technology) in the USA. Amal Admati, Hilary's competitor for the Krohl job, has completed his undergraduate degree in mathematics at Cambridge and is currently studying for his MA in biophysics at Cambridge; in terms of educational background, therefore, he is much more promising than Hilary. Later on in the play, when Hilary has been with the Krohl Institute for a number of years, a new recruit, Bo, »a young Chinese-American woman« (Stoppard 2015: 34), has degrees from Shanghai, CalTech and Cambridge.

So Hilary is an average third year student, and the way she debates with Spike the issues that she is interested in, is very characteristic, in the context of psychology (consciousness studies and evolutionary biology), of an average student expressing and formulating her ideas. What she has to say will be pleasing to hear for her university teachers, because they can see that she has begun to think about the issues on her own, rather than merely regurgitating taught and learnt material. However, what she has to say is not in any way brilliant, nor is the way she says it other than average. In Hytner's production, Olivia Vinall captures this profile very well indeed: she comes across as an attractive young woman with a level of interest and competence in her field that is average and a bit dull. It is a difficult profile to achieve for an actor, and it is not very rewarding even if done, as in this case, very well, because it is an impossible task to maintain audience interest in and attention for, a slightly dull character. Moreover, such a character is not an ideal vehicle for getting complex contents (evolutionary biology and consciousness studies) across to an audience, even if in conversation with characters who are presented as supposedly less dull, more charismatic — less average and more extraordinary. As Jerry Krohl, suggests in the final scene, there is a spectrum of possibility in reality, represented in Cathy for him; for the audience, Hilary represents an outlier on what Jerry calls the 'distribution curve'. She has yet to stabilise her beliefs and find her place.

Spike is a high flyer in academic terms, progressing from a junior post at Loughborough University to a professorship in one of the high prestige UK universities, University College London, and then to a high profile post at the Krohl Institute, within a relatively short period of time. This suggests that he is above average in his academic abilities. He has found his field, is certain about its boundaries, its potential, and has no doubts about those parameters at all. This allows him to focus well within the established context, and that is the basis for his success. His focus, however, also comes across as rigid, and that makes it ultimately as uninteresting as Hilary's ideas. Within his own context, Spike is dull as well.

At the beginning of the play, Hilary, the average student who will be lucky in due course with getting the Krohl job, and Spike, the high-flying but still average academic/scientist, are seen discussing the so-called prisoner's dilemma. This scenario is well known in the psychology of game theory. The prisoner's dilemma, in its simplest form, goes as follows. Two criminals are captured

and separately interrogated. If one confesses while the other remains silent he gets a plea deal. Both could confess or remain silent. The dilemma is in not knowing what the other criminal will do, and this raises questions of individual self-interest or group cooperation. Spike tells Hilary that in a prisoner's dilemma all that matters are the innate and ancient »survival strategies« (Stoppard 2015: 5), not the individuals. He is quite pessimistic and says that altruism is »an outlier« (Stoppard 2015: 5). While he is correct to say that cooperation is a strategy, over the long process of evolution organisms learned that cooperation is the best strategy. So altruism is not quite an outlier but an extension of cooperation. Many believe that cooperation evolved from the mother-child bond, extended to male parenting, to alloparenting, to kin (William D. Hamilton's inclusive fitness theory, 1964), and so on. However, Spike is correct to suggest that an evolutionary biologist would be reluctant to use the word *good*. What matters are motives to survive and especially to reproduce successfully. Nevertheless, a biologist who favours group selection might insist that behaviours can evolve for the good of a group. Many species have evolved tit-for-tat strategies (Robert Trivers' reciprocal altruism, 1971). There might be cases of pure altruism, but in the human world people want or expect reward or recognition, even unconsciously. Nevertheless, Jane Goodall (1986) and Frans de Waal (2013), to name two, offer accounts of apes that literally sacrificed their own safety, and in some cases lives, to help a conspecific or even a human being.

In reference to Hilary, Spike uses the expression »nature-nurture«. This is a popular misnomer. There is no simple dichotomy, and any evolutionary biologist would hesitate to over emphasize one more than another. It is somewhat closer to a fifty-fifty split, though in the case of social species, instincts can be shaped and moulded by learning, which is cultural. Hilary wants to get entry into the famed Krohl Institute with a model entitled Nature-Nurture Convergence in Egoistic and Altruistic Parent-Offspring Behaviour. The title reflects more on Hilary's situation, as we are to learn. Most evolutionary psychologists believe the mother to be of primary importance in care giving. We see this even in certain chemicals produced by the mother, such as oxytocin. In *Braintrust*, neuro-philosopher Patricia Churchland says that the ancient brain chemical oxytocin is an important operator in our moral systems. Originally implicated in reproduction, oxytocin is prevalent among vertebrates. However, only in mammals is oxytocin involved in infant care, and the theory is that eventually pro-social emotions so evolved. This is because oxytocin activates when the mother experiences stress against her offspring. Parental care by the father probably came much later in terms of pair-bonding with a female of the species and in terms of parental investment. Spike is correct to say that, however, there is competition between the mother and child. David Haig (1995) has done work in this area, and it is a simple fact that while in the womb the child is ever hungry for resources. But in line with Richard Dawkins' ([1976] 2006) misnamed notion of the selfish gene, the mother is able and willing on both an instinctual and conscious level to make this investment, since the infant not only holds her genes but is the machine that will produce offspring that will carry such genes into the future. Technically, fitness is reproductive success. Making healthy offspring ensures a line of descent. Hilary, however, tends to be anthropocentric, trying to find or apply *good* to such a natural process. Hilary wants to believe there are virtues in nature. Nature is neither good nor bad; it just is.

Hilary is upset that Spike is a strict materialist. We see this in their conversations about consciousness where he stresses matter. She seems to believe in a special ingredient, what Bergson called the *élan vital*, whereas Spike finds only neurons and synaptic connections. In Scene Five Hilary suggests that she wants to believe in »soul«, her word, and cannot accept that she is connected to the animal world in a long line of evolution. She's guilty of what Frans de Waal (1999) has labelled

anthropodenial. Much of this makes sense later when we find out about Hilary's teenage pregnancy. Clearly her decision of adoption has haunted her. Over the years, she has wondered and worried about her child, looking for meaning in the world that has made her into what she and others could consider a bad mother.

In the third scene there is talk of the Turing test — whether or not a computer can think. Hilary has applied for a number of jobs, including one which she is sure she does not have a chance to get, at the Krohl Institute for Brain Science owned by a rich financier, Krohl. Her competitor for the Krohl job, self-interested and unsympathetic Amal, likens the brain to a computer. This is an outdated analogy. He favours the computer over the brain. But the brain is organic and the product of selective forces. Amal's talk seems merely a foil to Hilary who vocally states that a computer is incapable of emotions. As a psychologist Hilary is less concerned with *how* the brain works and more concerned with how it seems to create a mind, an identity. She posits a dualism that marks her as a Cartesian in sharp contrast to Spike and the others. Introduced in this scene is the notion of luck, which is later tied to coincidence (and betting in Scene Four). In terms of natural selection, technically there is no randomness. In the first edition of *On the Origin of Species* (1859), one cannot even be sure Darwin uses the word random, favouring, instead, the concept of variation. Phenotypes emerge adaptations that evolve. Randomness would come by other means of evolution, such as mutations or genetic drift. Many mutations do not survive, and some are harmful. In terms of altruism, Trivers' (2006) model has been tested and proved: if we give, we expect something in return, so it is not a blind force of chance. Rather, it is an evolved trait.

In Scene Four, Hilary has been working at the Krohl Institute since the time depicted in Scene Three. The Institute is run by a billionaire capitalist, Jerry Krohl, hence the importance of the metaphors of luck and gaming. In this scene Krohl's eleven-year-old daughter Cathy asks her father if she were an orphan. She is concerned about creation and origins, which fits into the evolutionary theme of the play. We learn from this that she was adopted and that she knows this. We are also wondering about the likelihood of the coincidence of Krohl's adopted daughter Cathy being the same as Hilary's daughter Catherine. Darwin did recognize how chance factors into variation and circumstances and such chance can be beneficial to an organism and thus passed on. Stoppard's fabrication stands out here — what are the odds that Krohl would hire the birth mother of his adopted daughter? Does the answer to that question play into Hilary's ideas of God or into evolutionary biology?

In Scene Five, Hilary meets Cathy, who happens to walk into her office. At this point the audience wonders about the power of coincidence. Hilary does not yet know this is her child. Stage direction: »She doesn't know Cathy« (Stoppard 2015: 35). Oddly, there is no recognition of the child, which surely because of genetic inheritance must bear some facial resemblance to her; Hilary only pauses when she learns the child's name is Cathy. This is an important scene in that Hilary, who has not yet become skeptical of human nature, insists that »accountability, duty, freewill...« (Stoppard 2015: 37) do not appear in a brain scan. She is one hundred percent correct. The scan can show which areas light up when stimulated, but that does not account for or predict outcomes. The ultimate question seems to hover around how biology and genes can account for behaviour, such as altruism, or for consciousness. A few lines later, Hilary tells her research assistant that their work is not trying to measure empathy (Stoppard 2015: 39). Could that include her empathy, one wonders. The research involves testing young children of varying ages in terms of egoist/altruist values. Personal information on the questionnaires, then, is discarded, since if read could lead to »special cases« (Stoppard 2015: 41).

In Scene Seven, Hilary and Spike meet up again at a conference. Here, too, Hilary complains about Spike's hard-core materialism that leaves no room for the »sublime« (Stoppard 2015: 48). Spike is somewhat critical of her inability to do mathematical analysis, which apparently is the strength of Hilary's research assistant. This is telling since it was not until the mathematical models of the early and then mid twentieth century that much of Darwin's theory about gradual, natural selection was confirmed. Cathy by now is ready to turn thirteen, and Spike learns of Hilary's daughter for the first time. As at the opening of the play, in a scene with Spike, Hilary prays. The difference now is that, exasperated by his skepticism, she practically begs him to pray. In this scene she offers a rather puzzling line, perhaps deliberately ambiguous reflecting her own self-doubts and doubts about science: »somewhere between ape-men and the beginning of religion, we became aware of an enormous fact we didn't understand« (Stoppard 2015: 51). She has been living in shame, either for getting pregnant so young or making an adoption plan. In terms of evolutionary biology, she seems to be unaware of what evolutionary psychologists Jerome Barkow, Leda Cosmides, and John Tooby have dubbed as the adapted mind — as indicated by those comments about the ape-man. Popular culture depicts human evolution as linear, but it is not. Closer to Darwin's conception, evolution is a slow branching process with fits and starts. Hilary's use of the non-scientific term ape-man demonstrates her lack of evolutionary knowledge. There were many hominin and hominid species alive at the same time, and depending how far back one goes, some of our ancestors did have more ape-like behaviours, such as preference for an arboreal habitat. But we did not technically descend from chimpanzees or gorillas, our great ape cousins. Rather, we descended from an ancestor we held in common with the chimpanzee. On a related note, in the long process of hominid-hominin evolution, the brain evolved and expanded to selection pressures. An organism does not need a large brain and higher cortical functions to survive. Monkeys, lesser apes, great apes, human beings, and even other social mammals like dolphins have encephalized brains because of their complex social structures. As the brain evolved, put simply and to borrow from Howard Gardner and then Steven Mithen, separate intelligences related to awareness (such as those dealing with communication, sound, space, movement, and body) began to interact. Different areas of the brain became more fluid and flexible. Over time, the human mind itself adapted to the environment of other human beings, which gave rise to tool use and manufacture, complex hunting, mating preferences and practices, and advanced social structures. Given that we are evolved creatures, consciousness is an evolved mechanism.

When Hilary refers to the ape-man, she just blurts that out and Stoppard must have been aware that it does not make much sense. She might know but does not want to confront her own ultimate origins, the truth (which might make sense considering the secret she has been carrying). She is either an A student who pretends not to know, or she is a B- student who is out of her league. Her getting the job at the Krohl Institute seems too coincidental, but believable in the context of the interview. Hilary is an attractive European woman, dressed nicely. Amal is an Indian man and wears, according to the stage direction, a cheap suit. Amal is interviewed in the bathroom. Dr Leo Reinhart, the interviewer, we are told, likes the hard problem in spite of his penchant for the material side of brains (Stoppard 2015: 22). Hilary at this point does not even know the terminology »Hard Problem«. Amal is too focused on the mechanistic, computational analogy to the brain, whereas Leo understands that brains think and that there is something we call mind (Stoppard 2015: 22). Amal suggests that a computer can do more than what a brain can do (Stoppard 2015: 23), which seems to miff Leo. This conversation / interview has moved out of the bathroom and into the reception area where Hilary is waiting her turn. She overhears and interrupts, saying that while a



computer has speed, it has no depth, no thoughtfulness. When Leo asks Hilary what is her idea of deep, she responds brilliantly with »A computer that minds losing«. If we were to take Hilary to be, overall, a character of average rather than exceptional intelligence, this unambiguous instance of brilliance is a (welcome and much needed) »outlier«. The stage direction here is important: »Leo takes a moment to reconsider her« (Stoppard 2015: 23). That is where she has clinched the job. Amal is the better candidate, but Leo has a feeling about Hilary. She might not know what the hard problem is, and she might not know about biology or evolution, but she knows that a human being possesses an emotional mind, which a computer (so far) does not. And the whole point of the Krohl Institute is to study this, not to examine, as does Amal, mathematical computations. Amal already has (he believes) the answers — he says so: »There is overwhelming evidence that the brain causes consciousness« (Stoppard 2015: 23). Hilary counters and so demonstrates that she can work on the hard problem, since she sees mind, matter, and consciousness as problems (Stoppard 2015: 23).

But Hilary is a bit of a cheater. When pressed by Leo concerning the emergence of consciousness she begs ignorance and says: »I thought that's why we're here. To crack the Hard Problem« (Stoppard 2015: 24). In the same scene, two pages earlier, she was not even aware of the so-called hard problem. The question here arises whether Hilary is an operator. She is plagued by the adoption plan, and now she has managed to get this dream job. Has she compounded her feelings of guilt by snatching away from Amal this opportunity so that she tries to make amends later in accepting blame for the botched research? If she were not selfish, she would have raised her birth daughter and would not have, essentially, lied to Leo about knowing the hard problem.

The research Hilary had done concerning young children of various ages and egoist/altruist values is published in a journal. As published, the research demonstrates that children become more egoistic as they get older. The problem is that the research assistant who is expert in equations fudged the numbers. The published paper is all wrong. Magnanimously, later, Hilary tries to take all of the blame herself. Is she therefore altruistic? Why would she have trusted the greenhorn research assistant so much? Because she was good with numbers or because she suspected she could manipulate the numbers. In fact, the research assistant claims that she faked the equations to help Hilary. It's almost as if Hilary wanted to sabotage her career in science as an excuse to do something else. The question of self-interest plagues this play. However, there is a big difference between self-interest and selfishness. Is Hilary selfish? This is ironic in that forms of deception and cheating have and will always be around, but ultimately cheaters do not win. (Note, again, how Hilary's paper is entitled ›Ultimate Goods‹.) Hilary tried to prove that there is good in nature. Is she good for taking a fall? Besides, she should know we don't grow less caring and less helping as we age. We would not have survived if we were all cheaters. Spike thinks she's saying human nature is separate from animal. According to extensive research by Jessica Flack and Frans de Waal (2002), who chart ape (chimpanzee and bonobo) continuities with human beings, there is at bottom a common denominator of empathy. If she is separating human/animal nature she is wrong, since there is no strict separation, just a long continuum with differences.

Although Charles Darwin and Alfred Russel Wallace were the first naturalists to introduce the idea of evolution by means of natural selection, there had been a long line of evolutionary theories before them, but none explained precisely the mechanism of evolution. Natural selection is a long process of weeding out what does not work by refitting it with a working alternative. Operating through an individual organism, natural selection elicits adaptive traits that increase survival and reproductive potential, and these traits are eventually passed on. While Darwin knew there is a struggle for existence, other thinkers, such as Peter Kropotkin in 1902, wrote about mutual aid.

Clearly the notions of self-struggle and reciprocal helping are critical to Stoppard's play. For Darwin, there is no teleological design in nature, only adaptations, and we see Hilary grappling with this thesis and essentially rejecting it. Nevertheless, even Darwin's theory had gaps with his ignorance of gene theory, and this was not fully explained until the early twentieth century by J.B.S. Haldane (1932), Ronald Fisher (1930), and Sewall Wright (1931) who introduced complex mathematical equations about population genetics to prove Darwin's ideas sound. All of this is central to the play, since the subjects of consciousness, altruism, and parenting are products of natural selection. However, the playwright is careful to demonstrate how evolutionary information is shaped by the values and beliefs of individual characters. There might indeed be a problem, but how willing is any individual to accept a hypothetical answer?

Not surprisingly, by the end of the play Hilary is to leave England and go to New York to study philosophy. She learns that her daughter had been adopted by her wealthy ex-employer, but she is okay with that. Odd, considering how anti-materialist she is, happy her daughter will not want for anything. Perhaps she can, finally, justify her adoption decision by saying that her daughter has been and will be well cared for. The really hard problem seems less about any theory of consciousness and more about Hilary's decision, age fifteen, to make an adoption plan and now, with her professional career in ruins to leave England and so leave Cathy.

### ***The Hard Problem and Consciousness Studies***

The way in which Stoppard discusses, as we have shown above, evolutionary biology within his play *The Hard Problem*, is similar to the way he deals with other concepts and theories of philosophy and science: he plays with a set of given parameters and sheds interesting light on the lives of the characters, and our lives, in the process. A separate study can develop those parallels in detail. In *The Hard Problem*, Stoppard does not only deal with evolutionary biology, however, but also with consciousness studies, referenced in the very title of the play. Consciousness studies as an interdisciplinary field of study emerged in 1994 with the first biannual conference *Towards a Science of Consciousness*, held by the then recently founded *Center for Consciousness Studies* at the University of Arizona in Tucson, USA. The conference was attended by around 1,500 delegates. The launch of consciousness studies in the context of this conference represents a concerted multidisciplinary and transdisciplinary effort to address questions about human life. Questions of the nature of the mind and its relation to the body have been central to Western and Eastern philosophy (including Plato, Aristotle, Plotinus, Descartes, Hegel and others) and mysticism (Meister Eckhart, Jakob Boehme) since the onset of history. I have argued elsewhere that the entire history of philosophy could be re-written as the history of writings about human experience of consciousness (Meyer-Dinkgräfe 2013b: 125-9). In line with Stoppard's contribution to the programme notes for the National Theatre Production, the characters in the play discuss two positions on consciousness opposed to each other: dualism and materialistic monism. Dualism suggests that mind and body are separate entities. Monism suggests that only one substance exists primarily, either matter (body) or consciousness (mind, soul). Either matter is primary and gives rise to consciousness (materialism), or consciousness is primary and gives rise to matter (subjective monism). Independent of the conceptual backgrounds from which people discuss consciousness, it tends to be central to their argument that consciousness holds an elevated position, usually the highest in a hierarchy. From the materialist perspective, which materialists refer to as »bottom up«, consciousness arises from matter; it can be reduced to matter, but is still somehow more than matter. The »hard problem« of consciousness studies, for materialists,



is the question of how that matter gives rise to consciousness (Chalmers 1996). The perspective of subjective monism, on the other hand, considers consciousness as the primary substance, again at the highest position of a hierarchy, from which matter emerges.

The arts and humanities disciplines contribute to this understanding to some extent, but to a larger extent the arts and humanities benefit from the insights of other disciplines under the umbrella of consciousness studies in developing the understanding and knowledge specific to their own disciplines. (Meyer-Dinkgräfe 2013a: 13)

Stoppard does not consider subjective monism, in line with the position of current science, which subscribes to materialism. Stoppard's choice is also in line with evolutionary biology, which, as a science, is equally materialistic. This is the context for the materialistic take on consciousness in *The Hard Problem*. That materialistic approach, in reducing consciousness to matter, can leave many people, including Hilary, disappointed because they tend to feel that there must be more to consciousness. In the play, Hilary realises the need for breaking down boundaries of materialism and exploring new ideas; as a result, she asks interesting questions, but she does not find the answers to those questions within the frameworks and contexts of the disciplines she works in. Her questions relate to consciousness studies, more so than to evolutionary biology. Many academics claim that it is impossible, or very difficult to define what consciousness is in the first place, and Hilary and Spike struggle with that aspect of consciousness as well. Asked by Hilary to »explain consciousness«, Spike impatiently, as he is not really interested in this question, »takes her finger and holds it to the flame of the candle for a moment before she snatches it away with a little gasp«. Then he says: »Flame – finger – brain; brain – finger – ouch« (Stoppard 2015: 11). Spike is able, Hilary concludes, to explain mechanisms, but nothing beyond, such as sorrow. The reason for this, for Hilary, is that »the body is made of *things*, and things don't have thoughts« (Stoppard 2015: 12). Such reasoning, expecting there to be more than materialism allows for, leads her to find the »God idea« (Stoppard 2015: 12) more attractive. Stoppard develops Spike as Hilary's main antagonist, but in foregrounding Spike's evasiveness when it comes to talking about his materialistic world-view, Stoppard offers the audience the opportunity of considering Spike as a rather reluctant materialist. He is a scientist, and as a scientist he has learnt to follow certain rules of the discipline. His thinking is limited by the boundaries of what science can comprehend and explain, although he may well have intuitions that do not square with his scientific mind-set. Anything that does not fit that mind-set represents a threat to the mind-set; when challenged to discuss consciousness, Spike is reluctant to engage, because such engagement might open up the threat to his established mind-set. He is aware of that threat and seeks to avoid it if possible.

When Hilary has been working at the Krohl Institute for five years and prepares for a conference paper, she runs a number of possible ideas in the context of consciousness studies past Ursula, who also works there. Those questions encompass subjective monism — could the cosmos be teleological (No). What about panpsychism (No. Nature isn't conscious. Trees are not conscious). And materialism: Functionalism (No. A thermostat is not even a tiny bit conscious). What about quantum-level brain processes to explain consciousness? (»Will you show me how Gödel's Proof means a brain can't be modelled on a computer?«) (Stoppard 2015: 45-46).

New recruit Bo offers a take on one of Hilary's own research projects in ways that open up a new dimension hitherto not detected by Hilary. In addition, Bo develops a research project of her own, and comes up with results, that go some way of addressing, and answering the essence of

Hilary's own research questions about human goodness. However, it turns out that Bo, in order to please Hilary, whom she loves, manipulated the data in ways unacceptable in scientific methodology. This is the ultimate professional misconduct in the social sciences and science, comparable, perhaps, to an art historian intentionally certifying a forgery as genuine. Triggered by this event, at the end of the play, Hilary, faced with the choice of either seeing Bo lose her current job and any good further prospects, or taking the blame for the publication that needs to be retracted, decides to take the blame. She will leave her post at the Krohl Institute and study philosophy at New York University, because there someone is teaching philosophy »whose ideas are [...] undemonstrable« (Stoppard 2015: 75). The philosopher is probably Thomas Nagel. He is famous for the question, »What is it like to be a bat?« Amenable to Hilary, he pretty much seems against any reductionist (his word) explanations of consciousness. She hopes to be able to find answers to her questions there, unable to find them in science. The play thus does not answer her questions, and leaves them for Hilary's encounter with philosophy — perhaps Stoppard will provide the answers in his the next play?

The play seems to say there is a hard problem, but does not really define it fully, just as consciousness studies has not defined it fully, for in doing so, some argue, it would have answered it or abandoned it as a problem that does not really exist. Stoppard leaves the hard problem thus appropriately open. Stoppard hints at possible links between the hard problem of consciousness studies and evolutionary biology, but just as consciousness studies is still struggling to agree on a working definition of consciousness, those links are not explicit and definitive in the play. Stoppard asks: if consciousness is biologically evolved, and if like great apes we are social creatures, does that logically mean altruistic behaviour is mostly evolved and only in part learned? Stoppard takes these problems of science and gives them flesh and blood in characters like Hilary and Spike. The issues are implicit to the story of Hilary's life. The hard problem in consciousness studies, the question of *how* the body produces consciousness, has not been solved by science (Spike and colleagues at the Krohl Institute), and Hilary will look for it in the philosophy of New York University.

That Stoppard leaves open the definition of consciousness, permits inconclusive dialogue between Hilary and Spike, and sends Hilary off on a philosophical quest simply validates the existence of the hard problem. Especially through Hilary the play shows that both helpful and harmful behaviours are dependent on consciousness. Stoppard links the hard problem with Hilary to demonstrate how consciousness is less a scientific puzzle to be resolved but more so a real-life dilemma concerning altruism. In fact, the play implies that the brain might be incapable of solving its own hard problem. Consider the image of the box at the end of the play, which Hilary fills and then empties. The playwright symbolises materialism (consciousness from matter – the filled box) and subjective monism (matter from consciousness – the emptied box). There is a continuum of choices seen in Hilary's active shuffling of the contents. Good art is silent, so Stoppard does not supply any professorial definition to the hard problem but directs the audience to consider alternatives so as to posit its own hypotheses. Are answers about consciousness and altruism inside the box (proximate science and the *how*) or on the outside (ultimate philosophy and the *why*)? When does brain function or form (box) become conscious content (goods)? Stoppard leaves these as open questions but suggests that with further training Hilary will continue the conversation between evolutionary biology and philosophy.

In *The Hard Problem*, Stoppard raises issues that are central to science and to life. He raises some of those issues directly, some implicitly and indirectly, through characters that are average (like the majority of people in the world, and thus the majority of readers or spectators), and ultimately it might be up to readers or spectators, Stoppard seems to suggest, to answer the difficult

questions that the play raises. Consciousness studies is not like evolutionary biology in *The Hard Problem*, and the other concepts, approaches, theories and paradigms that Stoppard works with in many of his other plays. While those concepts are relatively well defined and understood as frameworks, consciousness remains elusive; different positions in the field are fiercely claiming to be exclusive and mutually incompatible with others, vigorously resisting attempts at building bridges. The hard problem faced by some materialists simply does not exist for other materialists, and does not arise for subjective monists. In *The Hard Problem* Stoppard thus enters what is for him, in the context of his other plays, new territory, in working not within a given, and thus relatively safe, framework. The openness of the play reflects this new territory.

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