**Situation-Specific Disease and Dispositional Function: response to Hausman**

In (Kingma [2010]) I argue that Boorse’s Biostatistical Theory of Health (BST, Boorse [1977], [1997]) is unable to accommodate diseases that are the normal result of harmful environments. Daniel Hausman ([2011]) offers a response: whilst I correctly identified the BST’s inability to label as diseases *actual* levels of functions that are normal in harmful environments in that paper, the BST retains the ability to call such conditions diseases because they constitute *diminished dispositional function*. In this paper I argue that Hausman’s proposal fails to generalise and therefore does not adequately answer my ([2010]) objection.

In *section one* I summarise the BST and the problem I raised for it (Kingma [2010]). In *section two* I outline Hausman’s response to this problem, which consists in comparing normal dispositional function against the *whole population or reference class*, rather than against organisms in similar circumstances. In *section three* I test Hausman’s proposal using a variety of examples, and find that it does not generalise across them. In *section 4* I examine and reject three possible responses on behalf of Hausman and/or Boorse, discussing in detail the concept of *functional efficiency* (Hausman [2011], [2012]). In *section 5* I conclude that Hausman has not succeeded in answering my ([2010]) challenge, and I reveal a link between the problem of environments (Kingma [2010]) and that of reference classes (Kingma [2007]).

**1 Kingma on Boorse**

**2 Hausman on Kingma**

**3 Response to Hausman**

**4 Three Possible Replies**

*4.1 Reference Classes*

*4.2 Temporary Pathologies*

*4.3 Adequacy of Function.*

**5 Concluding Discussion**

**Section 1: Kingma on Boorse**

Christopher Boorse ([1977], p. 567, [1997], p. 86, [2011], p. 27) offers an account of *health* as the absence of disease, and of *disease* as an adverse departure from the statistically typical contributions of subsystems to survival and reproduction in a reference class.[[1]](#endnote-1) In (Kingma [2010]) I systematically explicated Boorse’s account to emphasise three aspects of it. First, normal functioning is *situation-specific*; it is the contribution to survival and reproduction that is statistically typical *given* a situation. Without situation-specific function, the BST cannot capture adequately the very different demands that situations such as sleeping, sprinting or sexual intercourse place on our physiology. Second, health involves not only normal *actual* function but also normal *dispositional* function, where the latter is the ability to function normally in a range of non-actualised situations.[[2]](#endnote-2) To enable the discussion later on in this paper, we shall label an organism’s actual situation the *current situation,* and non-actualised situation with respect to which we specify an organism’s dispositional function a *target situation.* Third, biomedical functions should be described *quantitatively* rather than *qualitatively*; a healthy heart does not merely pump blood, but it does so within narrow normal quantitative parameters.

Following this explication of the BST, I raised the following problem (Kingma [2010]): there are situations, *harmful situations*, where the statistically typical causal contributions to survival and reproduction are pathological according to medical judgment. Examples include overdosing on paracetamol; excessive exposure to sun, heat, or cold; and exposure to carbon monoxide and certain infectious agents. The explicated BST must label the responses to these situations – liver failure, sunburn, frostbite, etc – normal, therefore healthy, and is therefore unable to account for a considerable subset of pathologies.

**2 Hausman on Kingma**

Hausman ([2011[) accepts my ([2010]) explications, and agrees that the BST must label *actual* situation-typical levels of function – including those in ‘harmful situations’ – as healthy.[[3]](#endnote-3) But he proposes a solution to the problem this presents by offering an interpretation of *dispositional function* that differs from my own. On Hausman’s interpretation, we judge whether an organism’s dispositional function is normal or pathological by reference to the functional ability of the *entire population or reference class*, which is in a range of current situations. I, by contrast, supposed that that judgment is to be made only by reference to organisms in the same current situation. According to my ([2010]), then, a carbon-monoxide poisoned organism’s inability to bind sufficient oxygen when exposed to normal air would be normal, and therefore healthy, because it is typical for organisms exposed to carbon-monoxide.[[4]](#endnote-4) Hausman, by contrast, proposes that a carbon-monoxide poisoned organism’s inability to bind sufficient oxygen when exposed to normal air is *not* normal – and therefore pathological – because organisms across a range of current situations typically are able to bind sufficient oxygen upon breathing normal air.

Hausman’s proposal appears to avoid my ([2010]) challenge to the BST – but at a price. Consider Carol’s digestive tract in four situations (table 1): 1) eating; 2) fasting (for, e.g., a festival or medical procedure); 3) directly after strenuous exercise; and 4) having ingested a digestion-disabling poison.[[5]](#endnote-5) Hausman’s interpretation of dispositional function (column 5) appears to give the right result for situation four – poisoning. But it does not concur with ordinary or medical judgment (column 6) in situation three – exercise. My ([2010]) interpretation of the BST, by contrast (column 4), accurately accounts for situation three, at the price of mislabelling situation four.

INSERT TABLE 1 around about here [it is referred to in previous paragraph]

Hausman ([2011], p. 666) is willing to bite this bullet: blisters caused by exercise, he states, are also considered pathological. But, as I shall argue in the next section, Hausman underestimates the size of this problem that he considers himself able to absorb; there many conditions other than exercise alone that cause dispositional dysfunction on Hausman’s interpretation of the BST. These include conditions that Hausman, and most definitely Boorse, cannot label temporary pathologies without doing serious damage to the BST’s concurrence with medical judgment. Hausman’s response, I shall conclude, fails.

**3 Response to Hausman**

Let me immediately grant the following: Hausman correctly identities our actual comparative *thinking* in cases of, for example, paracetamol overdoses, carbon monoxide poisoning, and poisoned Carol. We do compare such cases to the population or reference class as a whole. But for Hausman’s response to be successful against my ([2010]) challenge, it needs to be a generalisable interpretation of the BST; it should not just be an interpretation that is used when we have already identified a situation as harmful, for that would beg the question. Instead it should be an interpretation that generates the correct results in all situations within the scope of the BST. In this section I examine several examples that demonstrate that Hausman’s interpretation cannot be applied consistently.

A first group of examples where we appear to reason from situation-specific function rather than species-specific dispositional function can be found by looking at human reproductive functions. Take, for example, a healthy pregnant woman – that is, a woman who performs statistically typical functions for being at the stage of pregnancy that she is in. According to Hausman, the normal dispositional function of such a person should be compared to that of the population or reference class as a whole rather than, on Kingma’s interpretation, to that of other pregnant women. That commits Hausman to recognising a slew of pregnancy-related pathologies: amongst many others, pregnant women – in comparison to the whole population – have a reduced ability to run, lift, or bend over; are more disposed to sustain joint injuries because hormonal changes make soft tissue more flexible; have some suppression of the immune system; are less able to store moderate quantities of urine in their bladder; and lack various other normal physical abilities, such as the ability to directly come to a sitting position from a position of lying on one’s back, or the ability to keep sufficient tension in one’s pelvic floor whilst sneezing or coughing. Against Hausman, however, none of these problems are medically or conventionally considered pathologies; they are considered a normal aspect of being pregnant.[[6]](#endnote-6)

This problem is even more acute if we focus on childbirth, when many of the functional capacities that non-pregnant organisms ordinarily possess are drastically limited or absent. This includes very basic functional capacities: at some point during the second stage of labour, a birthing woman lacks the normal dispositional ability to hold in her stool, and she is also likely to pass through a phase where she is unable to pass urine because the fetal head compresses her urethra. Thus, like many aspects of pregnancy, giving birth would have to count as a pathological condition on Hausman’s interpretation of the BST.

Since there is a social tendency to medicalise pregnancy and birth, let me quickly mention two other reproductive examples that put pressure on the generalisability of Hausman’s response. First, there is breastfeeding. Hormonal changes involved in lactation suppress most women’s menstrual cycle and ability to conceive. It also diminishes a woman’s ability to lubricate the vaginal wall in response to arousal (Alder [1989]). Both effects are or can be considered pathological in non-breastfeeding women, but are considered normal and healthy for breast-feeding. Second, consider erect penises. Erections impair a man’s dispositional ability to pass urine. Thus if we accept Hausman’s interpretation of dispositional function, erect penises are pathological.

But because I do not want to hang *all* my counterexamples on reproductive functions – illustrative as they may be – here is a non-reproductive example: take an organism that is asleep (and preferably an organism that is not sleeping most of the time, so a human rather than a lion). Such an organism lacks many of the dispositional abilities that a waking organism has. It is suffering from paralysis, loss of consciousness, and it is not disposed to respond to very many sounds and sights that it would ordinarily respond to, and that it is normal for the species to respond to. On Hausman’s interpretation of the BST, that would make sleeping a pathological condition.

Hausman ([2011]. p. 664) claims to see “no justification for [Kingma’s] way of interpreting the notion of normal [dispositional functions], which makes nonsense of the BST.” But I have just provided that justification: My interpretation is the only way for the BST to make sense of many core physiological functions, including sleep and most elements of reproductive function. Indeed it is the obvious interpretation if one’s starting point is to think of the normal and ordinary – sleep and reproductive function – rather than unusual and contrived: poisoned Carol. While Hausman is right, then, to state that my interpretation makes the BST nonsensical – which of course was the very reason for my ([2010]) challenge – he is wrong to conclude that the problem lies with my interpretation. Hausman’s own interpretation makes the BST just as nonsensical; although his solution may well seem obvious or attractive in terms of generating the correct answer for poisoned Carol – where my interpretation makes no sense – it results in a complete mess in the context of much more basic biological functions such as reproduction and sleep, where my interpretation has no problem. The problem of generating nonsense, then, does not lie with either Hausman’s or my interpretation of the BST: it lies with the BST itself. Hausman’s ([2011]) proposal is unable to dissolve my ([2010]) challenge.

**4 Three Possible Replies**

In this section I examine three possible ways in which Hausman and/or Boorse might respond to my arguments. The first is to fall back on reference classes, the second is to accept a slew of ‘temporary pathologies’, and the third is to offer an alternative account of functional efficiency.

*4.1 Reference Classes*

We might think that, for example, my example of a pregnant or birthing woman should not be captured under the situation-specific functioning model, but should be dealt with by constructing a separate reference class. On the face of it that makes sense: pregnancy, like age or sex, is a particular life stage and/or a way of being in the species that makes a distinct contribution to survival, and that is characterised by a tendency to run a specific normal course. If being pregnant or asleep constituted distinct reference classes, then the functional limitations identified above would be transformed into statistically normal traits.

But constructing new reference classes in response to my ([2010]) challenge does not solve anything for the BST; as I argue elsewhere reference classes themselves undermine Boorse’s claim to naturalism, because no value-free justification could be provided that identified the ones, out of an arbitrary set, that are admissible on the BST (Kingma [2007]). Thus by changing the question about the distinction between harmful and non-harmful situations to a question about what constitutes a principled basis for specifying a reference class, one does not solve a problem; one only pushes the problem around. The connection this reveals between the reference class problem and the problem of harmful situations will be examined further in the final section.

*4.2 Temporary Pathologies*

A second possible comeback is simply to accept that healthy conditions are often accompanied by a slew of ‘temporary pathologies’. This would be an extension of Hausman’s original response: just as exercise can cause blisters, it can cause other ‘temporary pathologies’ such as reduced digestive activity. Similarly, on this view, pregnancy, birth and breastfeeding are accompanied by a slew of temporary pathologies, e.g., not having much bladder capacity, not being able to run very well, not being able to sit straight up from a position of lying on ones back, etc. In the same vein erections cause the temporary pathology of not being able to urinate, and sleeping is accompanied by, amongst others, the temporary pathologies ‘paralysis’ and ‘unconsciousness’.

Whilst this type of response might be adhered to on consistency grounds, it is not compatible with the overall aim of the BST, which was to give an account of medical judgments of the healthy and pathological. On no remotely sensible interpretation of medical judgment can the normal aspects of sleep, or the inability of men to urinate whilst having an erection, be labelled a ‘temporary pathology’.

This response is also incompatible with Boorse’s explicitly stated commitments: it is an absolute and inviolable constraint on his account that the elements of normal reproductive functioning, no matter how irritating, painful, disliked or abnormal from a non-reproductive point of view, can never be pathological (Boorse [1997], pp. 92-94).

*4.3 Adequacy of Function.*

In the final part of his paper, Hausman hints at a possibly different and much more interesting response to the kind of cases I raise. He proposes a distinction between functional *efficiency* and functional *activity*, where the functional efficiency of a part is a matter of how well a part is carrying out its function, not how active a part is. The idea is that the lack of digestive activity after exercise would be *functionally efficient* – i.e., the right thing for the organism to do – in a way that a lack of digestive activity after taking a poison in not. If this succeeds, then in the case of reduced functional activity after exercise there would be no dysfunction that needs to be explained away.

There are two ways in which we might interpret this distinction. One is statistical, and in keeping with the BST. The other abandons statistics, and its relation with the BST is less clear. Take the statistical interpretation first. I assume that Hausman’s distinction works, roughly, as follows: functional *activity* means the level at which a given qualitative function is performed. Functional *efficiency* signifies the *appropriateness* of that level of functional activity for the current situation and those immediately preceding it. So, for example, suppose the current functional activity of my heart is a heart rate of 130 and a blood pressure of 150/70. This is appropriate for my sitting in my chair and typing *given* that I have just run up the four flights of stairs to my office after cycling to work. But it would not have been appropriate or functionally efficient had I already been sitting in this chair for an hour (in which case it should be more like 70 and 105/65). Had I been Lance Armstrong, however, the activity of my heart performing at equal degrees of functional efficiency would have been different again; Armstrong’s heart is much more powerful than mine, so it would achieve functional efficiency in either of these circumstances at a considerably lower heart rate.

If we keep Hausman’s distinction in line with the BST, then the obvious way to cash out ‘appropriate’ is ‘statistically typical’ (where this refers not to the activity level, but to the efficiency of the contribution). But that cannot be what Hausman has in mind. For if the appropriateness of a functional activity is still to be cashed out in terms of its statistical typicality, then although Carol’s lack of digestive dispositional function after exercise will be ‘efficient’ – i.e. a statistically typical degree of contribution to her goals – her lack of digestive dispositional function after eating poison will be too. For that, too, is a statistically typical degree of contribution to her goals *given* the situation she is in *and* those that immediately preceded it.

Instead, Hausman must have in mind a different way of cashing out appropriateness or functional efficiency, which abandons statistical typicality. But it is not entirely clear what this alternative is. Hausman ([2011]) asserts that a lack of digestion following exercise is *functional*: it *c*ontributes to survival by allowing more blood to flow to skeletal muscles, aiding recovery – which implies that indigestion after poison has no function.[[7]](#endnote-7) But on Boorse’s account of function, as I elaborated at length in (Kingma [2010]) and above, the statistically typical causal contribution to survival and reproduction in these situations *is* what functionality is. In both situations that is to be disposed to digest very little, which means that, following Boorse’s account, in both situations the organism functions normally.[[8]](#endnote-8) So either Hausman has arrived back at the starting point of my ([2010]) paper, or – more plausibly – he has a non-statistical alternative to Boorse’s account of function in mind.

There are two things to note about this. First, abandoning Boorse’s account of function means we are no longer dealing with a response on behalf of the BST, but with an admission of its defeat. My ([2010]) challenge was built upon the central role that statistics play in the BST, and aimed at Boorse’s account of function. If the result of that challenge is that those statistics and Boorse’s account of function should be abandoned in favour of a different account, then my ([2010]) challege at the level of the BST has been successful.

Second, and much more importantly, this raises the question what different account of function and/or health Hausman suggests we should adopt instead. This is not elaborated in Hausman ([2011]), but Hausman ([2012]) provides details. He explicitly abandons a purely statistical view of the BST, offering a new though related account of normal function that relegates the role of statistics to that of merely providing *evidence* for normal function, as opposed to *defining* normal function. On Hausman’s proposal the distinction between the healthy and the pathological becomes less important. What *is* important on his account is the notion of *functional efficiency*: a comparative notion of how well an organism is meeting its goals given the environment and circumstances it is in.

To evaluate Hausman’s ([2012]) account in detail is beyond the scope of this paper. But I can investigate whether either of the Hausman papers provides an account of functional efficiency that can distinguish between reductions in functional capacity due to, e.g., poisoning, and reductions in functional capacity due to, e.g. reproductive activity, such that the latter but not the former comes out as functionally efficient, and therefore healthy. The answer is that they cannot.

As I understand it, Hausman calls an organism functionally efficient if it meets it biological goals in the best way possible *given* the situation an organism is in and *given* the constraints or “engineering specifications”[[9]](#endnote-9) of that type of organisms in general. (Type of organisms because if we focused on the “engineering capacities” of the organism under consideration only, then a deaf paraplegic organism would be maximally efficient). So an organism that diverts maximal amounts of blood to its skeletal muscles at the expense of its digestive tract is functionally efficient, because if it were to divert less blood to its skeletal muscles in favour of retaining its disposition to digest food in situations where large muscular output and subsequent recovery is required, then this would contribute to its overall goals less well. Whilst of course it would be nice if the organism had endless amounts of blood, or blood that could carry far more oxygen per litre than it does, so that it did not have to temporarily sacrifice its digestive dispositions in favour of its muscles, that is simply not how the “design specs” of [a typical instance] of that organism – or the laws of nature – are.

But this is no different for the case of poisoning. For how would a poison work? Suppose it works – as it probably would – by binding a particular receptor that disables a trans membrane pump, such that the organism is unable to absorb water or certain electrolytes from the gut. If so, the poisoned organism is functionally efficient by sacrificing its digestive capacities. For if the organism went ahead as normal, but with a disabled pump [which luckily it can’t do] it would quickly dehydrate and/or develop electrolyte imbalance. This would be far worse in terms of meeting its overall goals than sacrificing its digestive capacities for a while. Here, too, the lack of digestive activity would be functionally efficient. And whilst of course it would be nice if the organism could digest without needing that pump, or in the presence of the poison, that is simply not how the “design specs” of (a typical instance) of that organism – or the laws of nature – are.

Similarly in terms of the organism’s overall goals it is better to gestate a foetus for a long time, at the expense of one’s ability to run fast, than it is to give birth at 20 weeks, before running becomes a problem. It would be nice, of course, if we could gestate foetuses to decent viability without being impaired in running, but that is not how our design specs are. It is also better for an organism’s overall goals to keep breathing whilst inhaling air that contains CO, than to stop breathing in those circumstances. For although that latter action would allow it to retain its dispositional ability to bind oxygen, it would do so only for a few minutes – until it dies of lack of oxygen. Absorbing some CO is therefore the functionally efficient thing for an organism to do when exposed to CO. And although it would, of course, be nice if humans could breathe CO without its permanently binding receptors on haemoglobin, thus blocking out oxygen, that is not how our design specs – or the laws of nature – are. Both pregnancy and carbon monoxide poisoning are situations, then, in which an organism’s functional contributions and dispositions are efficient for the situation it is in, on Hausman’s proposal as I understand it. Functional efficiency does not distinguish between them, and therefore does not provide an adequate answer to the kind of cases I presented in section three, or to my ([2010]) challenge: an account that deals with erections and CO poisoning in the same way simply fails as an account of health and disease.

What Hausman might do in response, and perhaps even does in his ([2012]), is to grant that both pregnancy and CO poisoning are functionally efficient, and either fall back on the ‘slew of pathologies’ response, or allow for some contextual variation in judgments of when functional efficiency is (more or less) pathological.[[10]](#endnote-10) The former I have already dealt with. The latter deserves more careful attention than I can devote to it here, but seems problematic at least on the face of it. First, it fatally undermines functional adequacy as a response to my ([2010]), because it posits an account of function or functional efficiency that on its own cannot distinguish between erections and poisoning. Second, it seems at risk of undermining the general project of providing a naturalist account of health and disease, a project to which Boorse, at least, always has been firmly committed. Whether it does undermine naturalism depends on the degree to which ‘contextual judgments’ are compatible with a naturalist interpretation.

**5 Concluding Discussion**

Hausman ([2011]) attempts to guide the BST out of the dilemma I identified for it in Kingma ([2010]): on one horn the BST could define functions as situation-specific which makes it unable to account for the fact that some situation-specific normal functions are diseases. On the other horn, the BST could give an account of function that transcends situation-specificity, but this results in it being unable to account for the situation-specific variety in both our qualitative and quantitative functional performance. Hausman offers two kinds of responses. First, he offers an interpretation of dysfunction as a reduction in dispositional function compared to the population as a whole, rather than in comparison with organisms in the same situation. This response fails because, if adopted as a generalised or systematic solution for to BST, it labels conditions such as pregnancy, sleep and erections as dysfunctions. In other words, it cannot do justice to the idea that when judging a considerable set of basic physiological functions, we judge dispositional function in a situation-specific way. Second, Hausman ([2011], [2012]) seems to attempt to dissolve Kingma’s challenge by appealing to functional efficiency, which is to be cashed out in a non-statistical way. Not only does this amount to an admission of defeat on behalf of the BST, and a proposal of a new account of function instead, it also fails as a response in its own right because it cannot distinguish between pathological conditions due to ‘harmful situations’, such as poisoning, and physiological conditions tied to particular situations – such as reproductive functions – at the level of functional efficiency.

So, where to go from here? There is an interesting and important relationship between the problems discussed in this paper, and the problem of reference classes I raised in my ([2007]). In that latter paper I do not argue that the BST is inaccurate or wrong, but merely that the account is not completely value-free: the BST can only start to use statistical abstractions to determine what is normal, if it has defined actual or hypothetical reference populations. Those populations are stratified by age, sex and perhaps race, but not by, say, having diabetes, Huntington’s Disease or being congenitally deaf. This specification is both necessary and crucial; if those latter populations would also be admissible as reference populations, then the diseases that define them would be statistically normal, and therefore healthy, according to the BST. In my ([2007]) I argue that there is no non-circular, value-free justification for the inclusion of some populations, but the exclusion of others, as reference classes on the BST. (See also Wiśniewski [2012] and Kingma, [2012a]). This suggests that the BST is not a completely value-free account of disease.

The relationship between the reference-class problem and the environments problem is that both result from the simple finding that an appeal to the statistical normality of functions cannot do all the work for us. In order to successfully employ statistics to define the normality of functions, and thereby health, we not only must start with some norm-defining populations, but also with norm-defining situations.[[11]](#endnote-11) Where Boorse has asserted from the start what those populations would be, no exhaustive list of norm-defining situations has been provided, nor has it been very clear that there should be such a list.[[12]](#endnote-12) One possible conclusion from my ([2010]) and the present discussion is that environments and situations are, in this respect, a bit like reference classes: we need to simply decide which ones are ‘in’ – erections, birth, having sex, eating a range of foods, fasting, sleeping, exercising, breastfeeding, menstruating, ejaculating – and which ones are ‘out’: eating poison; breathing CO; being at an altitude above 4000 metres; exposure to high levels of infectious agents, etc. Once that decision is made, the BST – on my interpretation of the ‘in’ cases and/or Hausman’s interpretation on the ‘out’ cases – would remain remarkably successful in accounting for our health and disease judgments. But just as the choice of reference classes needs to be naturalistically justified if the BST is to preserve a claim to value-freedom – which, according to my ([2007]), it could not do – so the choice of norm-defining environments or situations needs a full, consistent, value-free justification if the BST is to remain value-free.

The new question, then, is what norm-defining situations are and whether they can be defined, justified and applied in a value-free way. I already discussed several possible value-free ways of defining norm-defining environments in (Kingma [2010], pp. 254-258), and found them unsatisfactory. The same can be said for Hausman’s ([2011]) proposal. But Hausman ([2012]) and Garson & Piccinini ([2013]) may offer possible new ways of justifying that distinction that I have no time to evaluate here. Pending that investigation, let me finish with a temporary conclusion, a speculation and a suggestion. The temporary conclusion is that Boorse’s initial aim for the BST – demonstrating that health and disease are completely value-free concepts – cannot be sustained on the arguments here examined. The speculation is that the BST or one of its modifications (Hausman [2012]; see also Schroeder [2013]) may offer us the resources to develop a modified view of health and disease that is at once scientifically informed, consistent and rigorous, but must also accommodate – within a clearly defined space – social and evaluative input (see also Kingma [2012b]). The suggestion is that such a well-defined, sophisticated, and consistent account of functional comparisons in combination with a clearly defined place for social and evaluative input and judgment points the way forward: out of the traditional naturalism/normativist opposition, and on towards a scientifically informed and naturalised – though not naturalistic – account of health and disease.

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1. I have argued elsewhere that the use of reference classes undermines the claim that the BST is value-free (Kingma [2007]). But since the BST makes very little sense without the use of reference classes – at least age, sex and possibly ‘race’ – I shall take their use for granted in this paper. [↑](#endnote-ref-1)
2. Hausman ([2011]) calls these *capacities*. [↑](#endnote-ref-2)
3. That latter admission is pretty damaging for the BST even if the rest of Hausman’s argument is successful – which I will argue is not the case. But Hausman (personal communication, 26 Sep 2012) no longer subscribes to it. Instead he believes that paracetamol overdose is not a *relevant* situation for liver function. Therefore the *actual* functioning in this case would be neither healthy nor pathological; only dispositional function can be judged healthy or pathological in non-relevant situations. See also Hausman ([2011] fn6). I do not assess this argument here. [↑](#endnote-ref-3)
4. Let me resolve an ambiguity here: like Hausman ([2011] p. 659) I do not think that the comparison group consists of people *actually* in the same situation. Rather the comparison is to the entire population or reference class *were they to be in the same situation*. This avoids a problem that Cooper ([2002] p. 266-267) raises against Boorse, which is based on the first, less plausible, interpretation. [↑](#endnote-ref-4)
5. See Kingma ([2010]) and Hausman ([2011]) for more detail on and discussion of this example. [↑](#endnote-ref-5)
6. Note that I have deliberately not mentioned morning sickness. Morning sickness when it is very severe is considered a medical pathology (hyperemesis gravidarum). But severe morning sickness is not typical. Ordinary tiredness and nausea during the first trimester, by contrast, are. And, they, to the dismay of those suffering from them, are considered just that: normal. Like menstruation and teething and pain in labour they are severely disliked, and we might well seek to relieve these conditions if we can. But they are not considered pathological. (See also Boorse [1997]). [↑](#endnote-ref-6)
7. Hausman ([2011] p. 666) writes: ‘If, on the other hand, inactivity following exercise has a function (such as permitting better blood flow to the muscles), then in the wake of vigorous exercise, there may be no decrease in functional capacity.’ [↑](#endnote-ref-7)
8. In ([2010] p. 259) I already noted that it would be a mistake to think that the digestive system in Carol makes *no* contribution whatsoever. First, we may assume that it does do something, even if very little. Second, and more importantly – as set out in more detail in a few paragraphs – by doing very little the digestive system makes a contribution that is better than the one it would make by having higher levels of activity, just as thrombocytes make a contribution to survival and reproduction by *not* aggregating randomly in the absence of tissue damage. Precisely because of Hausman’s distinction between activity and efficiency, the activity is not what matters, but the contribution is. And that contribution can be positive even if – or precisely when – the activity is absent. [↑](#endnote-ref-8)
9. Hausman ([2012] p. 533). [↑](#endnote-ref-9)
10. In the following paragraph, for example, Hausman may be hinting at such contextual variation: ‘What counts as “significantly” worse than maximal functioning in some benchmark environment is inevitably vague and *context-dependent*. When there are discrete and salient differences in functioning, such as the difference between no cavities and some cavities, those often define nontrivial differences. In the absence of differences such as these, differences that seem worthy of note because of their consequences for valued traits and activities, that make large differences in the functioning of other systems, or that make large differences in the probability of survival and reproduction count as significant. These separate sufficient conditions for the health and pathology of parts and processes constrain where the line between health and pathology should be drawn, but they do not determine its location.’ (Hausman [2012] p. 537, *my emphasis*) . [↑](#endnote-ref-10)
11. Indeed Hausman seems to explicitly develop this line of thought when he speaks of “benchmark environments” Hausman ([2012] p. 536). [↑](#endnote-ref-11)
12. Though, in a sense, Boorse ([1997] pp. 83-84) recognises this problem, and makes a first attempt at such a list. I reply in (Kingma [2010] pp. 255-6).

    *Table 1: Carol’s dispositional functioning – discrepancies in* ***bold****, underscore.*

    |  |  |  |  |  |  |
    | --- | --- | --- | --- | --- | --- |
    | ***Situation*** | ***Activity of Digestive System*** | ***Normal function for situation*** | ***Kingma ([2010]): Situation-Normal Dispositional Function*** | ***Hausman ([2011]):***  ***Species- Normal Dispositional Function*** | ***Healthy in medical & common judgment*** |
    | 1. eating | Active | YES | YES | YES | YES |
    | 2. fasting | Low activity | YES | YES | YES | YES |
    | 3. exercise | Low activity | YES | **YES** | **NO** | **YES** |
    | 4. poison | Low activity | YES | **YES** | **NO** | **NO** |

    [↑](#endnote-ref-12)