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What Kind of Animal is the “Three Rs”?

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Summary

Fifty years after the publication of *The Principles of Humane Experimental Technique* by Russell and Burch, this paper explores the contemporary role of the Three Rs. This is illustrated by reference to a recent social scientific study, which involved a total of 50 in-depth interviews with scientists who use animals and with other stakeholders in the debate. The data analysis shows how the Three Rs are conceptualised in at least three ways: firstly, as an *ethical* animal, either as a shorthand for a moral imperative, or as a route to managing an ethical dilemma; secondly, as a *scientific* animal, internal to the scientific method; and finally, as a *political* animal, with some stakeholders referring to the Three Rs as a way to promote consensus in a controversial domain. Pushing the metaphor a little further, the paper concludes that the Three Rs concept has become a kind of hybrid animal.

Keywords

animal research; ethics; qualitative methods; Three Rs

Introduction

From humble roots in 1959, the Three Rs of replacement, reduction and refinement, proposed by W.M.S. Russell and R.L. Burch in *The Principles of Humane Experimental Technique* (1), have become a key fixture of the debate about the use of animals in scientific research. Half a century on, there are many opinions about the Three Rs, and about what kind of impact the concept has had. The aim of this paper is not to list positive or negative views. Instead, it addresses a slightly more analytical question: *What kind of animal is the Three Rs concept?* When asked to justify their views, how do stakeholders talk about (i.e. conceptualise) the Three Rs? A literature search reveals relatively little previous academic consideration of this issue. This paper therefore draws on a recent empirical study, which involved interviews with a wide variety of stakeholders. The results suggest that interviewees conceptualise the Three Rs in at least three ways. As the discussion demonstrates, there are risks or limitations with each conceptualisation.

Methods

This paper is written as part of a broader research study, which aims to understand the debate over the use of animals in scientific research. The empirical stage of the project (2007 to 2008) involved a total of 50 qualitative interviews with individuals including Home Office project licence holders, animal protection organisations, and with research funders and regulators. The interviews lasted for about an hour, and all except one of them were digitally recorded and transcribed. Most of the interviews were conducted face-to-face in the respondents' places of work, but a minority ($n = 9$) were over the telephone. The scientists were based at one of two universities in the UK, and used a variety of animal species. As with most research studies of this type, participation was voluntary: therefore, the data cannot automatically be regarded as representative of 'all scientists'.

One strength of the research study is the wide range of interview participants. Close comparison between the interview transcripts enables common themes (rather than the oft-quoted differences) to be identified. Another strength is the use of qualitative methods. The interviewer used a series of open-ended questions, in order to encourage the participants to discuss the topic in their own terms. This is important, so as not to impose definitions of concepts (such as rights, welfare or the Three Rs) in advance.

Practical examples of *replacement*, *refinement* and *reduction* were mentioned throughout the interviews. However, in order to make the analysis more manageable, what follows focuses on the way in which the Three Rs as a concept is mentioned explicitly. Even with this proviso, space permits only a limited number of interview extracts to be included. Direct quotations from organisations are used, to illustrate a wide range of positions and should not be taken as direct policy statements. Some quotations from *The Principles* are included, where they help to contextualise the argument.

Results

The Three Rs as an 'ethical animal'

On first reading *The Principles*, I was struck by the apparent lack of reference to ethical rights or wrongs. Indeed, the authors use capital letters to stress that their use of humane throughout the book refers to the "objective assessment of the effects of any procedure on the animal subject" and "must NOT BE TAKEN TO IMPLY ETHICAL CRITICISM OR EVEN PSYCHOLOGICAL DESCRIPTION OF PERSONS PRACTICING ANY GIVEN PROCEDURE" (1). This original framing may partly explain why, among a vast literature on the ethics of laboratory experimentation (e.g. 2) there appears little direct ethical analysis of The Three Rs. This is confirmed by a recent online article, which argued that the Three Rs do not derive from any particular ethical theory and that "the ethical status of the Three Rs still remains to be clarified" (3).

However, what is clear from the interview data is that the Three Rs concept *is* being conceptualised as a kind of ethical principle or shorthand for ethics. First, is the idea that scientists have a moral obligation to the animals under their care and that this duty is encouraged by adherence to the Three Rs. This idea was frequently voiced during interviews

with organisations that fund animal research, such as the Medical Research Council (MRC) and Biotechnology and Biological Sciences Research Council (BBSRC). It was also voiced by some individual laboratory scientists. To cite just one example:

“I think it [the Three Rs] is absolutely essential. I just think you really do have a commitment to making things as good as you can for the animals...I think *we have a moral obligation* to, you know, the rats are completely dependent on us and I think we owe it to them to make things as good as we can to do the science.” (Laboratory researcher)

The second, related, claim is that adopting the Three Rs helps deal with the moral dilemma that is caused by research involving the use of animals. This was highlighted by several of the interviewees, most succinctly by a member of staff from the NC3Rs:

“So as I said before, we sell the Three Rs on a variety of reasons, and those would be, you know, benefits to animals. So *managing the ethical dilemma*, if you like, which is raised by causing animals harm for various kinds of human benefit. But they can also be good from a scientific perspective.” (NC3Rs)

This issue was also briefly addressed by the Nuffield Council on Bioethics in its 2005 report (4), which argued that, for those who see animal research as a moral dilemma, the implementation of the Three Rs (and especially replacement) is extremely urgent, partly as a way of avoiding an ‘existential crisis’. This is similar to a point made by the Institute for Medical Ethics working party in 1991 (5): “We ought not to be content to act and live in circumstances of moral conflict if this is avoidable”. According to some interviewees, then, one benefit of the Three Rs is that they can help us move away from a sensation of moral crisis or conflict.

In summary, the interview study suggests that some stakeholders conceptualise the Three Rs as a kind of ethical animal. This is also apparent outside of this particular study. For example, Vicky Robinson of the NC3Rs has previously written that “The 3Rs are also important from an ethical standpoint...In a humane society there is clearly a moral obligation to ensure that any harm is kept to an absolute minimum” (6). This use of the term ‘humane’ is apparently different to Russell and Burch’s original usage. Of course, it would not be surprising, if the meaning of the Three Rs had evolved over time. For present purposes, the main point is that the Three Rs concept does appear to be used as a kind of ethical principle. This contrasts with the next section, where the Three Rs are conceptualised as internal to the scientific method.

The Three Rs as a ‘scientific animal’

As already discussed, Russell and Burch describe humanity as an ‘objective’ assessment, rather than a moral category. Time and again throughout the book, the authors link the Three Rs with good scientific practice. As they explain at the start, “by now it is widely recognised that the humanist possible treatment of experimental animals, far from being an obstacle, is actually a prerequisite for successful animal experiment...the intimate relationship between humanity and efficiency in experimentation will recur constantly as a major theme in the present book” (7).

The tone of the book is of a plea for a new kind of science. Fifty years later, when asked about the Three Rs, a majority of the scientists interviewed did conceptualise the Three Rs in relation to good scientific practice. Notice how, in the following example, advances in the Three Rs are presented as ‘ongoing’, ‘constant’, and ‘obvious’:

“You can’t study behaviour in cell culture obviously. So I think *replacement* for us, we’re not at the stage where we can consider *replacement*. *Refinement* is something that’s constantly ongoing, particularly in terms of surgical procedures and behavioural tests. We are constantly trying to improve those for welfare reasons, but also for scientific reasons. The better the tests and the better surgical procedures that we can use, the better the data. So I mean, you know, it’s obvious in a way that you would want to do that anyway. *Reduction* is something that again economically makes sense for us as well.” (Laboratory researcher)

On the one hand, such extracts could be read by Three Rs advocates as positive evidence for the mainstreaming of Russell and Burch’s vision for laboratory research. On the other hand, this formulation creates a potential risk: If the Three Rs are simply part of normal scientific practice, why do we need Three R initiatives? A high level of frustration was voiced by several interviewees, including the following licence holder, who uses primates in research:

“I think that on the whole the concept of the Three Rs, on the whole, has been harmful really...do you think I need somebody to tell me to use the minimum necessary [laughs], which is the concept of reductions? And if there’s a population of patients readily available in whom I can carry out a certain test, something that’s relevant to something I’m investigating, do you think I’m not going to do that? You know, I don’t need somebody to tell me to do that. But what the Three Rs turns out to mean in practice is that you have people always yapping at your heels, particularly the NC3Rs, people always yapping at your heels to say well why don’t you try this, why don’t you try that, often with bad effects you see...” (Laboratory researcher)

What is at issue here is not the value of replacing, reducing or refining animal experiments *per se*, but the perceived imposition of the Three Rs concept from outside. A similar point was made by organisations who campaign on behalf of the need for animal research, such as Pro-Test and RDS (now known as Understanding Animal Research):

“You know, again it’s just good science... And you know, from what I’ve seen, the Three Rs aren’t, don’t need legislating. They are just embedded in scientific method, sort of the natural progression...” (ProTest)

“But it [*reduction*] is essentially about good experimental design, it’s about defining clearly what it is you’re trying to measure or trying to reduce variability, doing your power equations and making sure you use the right number and the right species of animals and all these kind of things. Which should come from good science, it’s not something that should be imposed on scientists is it? Getting their experimental design right, it’s something they should do.” (RDS)

To summarise this section, the data from the interview study appear to echo some of the spirit of Russell and Burch’s original exposition. The Three Rs do therefore seem to be

conceptualised as a kind of shorthand for ‘good’ (i.e. efficient, reliable) science. However, the interview data also contain evidence of frustration about the perceived imposition of the Three Rs. This relates to wider debates, unfortunately beyond the scope of this paper, about the role of regulation and guidelines in promoting compliance with a particular policy or norm.

The Three Rs as a ‘political animal’

The aim of *The Principles* is clearly not to evaluate the social or political feasibility of the Three Rs. Nevertheless, the final chapter does make reference to the factors that Russell and Burch see as influencing progress. However, the authors themselves admit that this is a ‘sketch’ and that “The sociological factors especially deserve a much fuller treatment” (8). Fifty years on, some interviewees *did* reflect on the political nature of the Three Rs. To be clear, the term ‘political’ here is not used in a pejorative or party political sense, but instead refers to the way that the Three Rs have become a strategic question for stakeholders in the debate.

During interviews with representatives of organisations who contribute to the debate, the political benefits of the Three Rs were noted. As exemplified in the following quotes, the Three Rs are seen as symbolic of the middle ground:

“So I see actually at the moment the middle ground is very, is very strong and there’s you know *broad agreement* that we should be pushing the Three Rs. That we should be critically appraising the use of animals in various areas of research, systematic reviews, all of these kind of things that are more in the Three Rs kind of territory.” (RDS)

“So I think theoretically they [the Three Rs] are strong. And they are, you know, pragmatic in the sense that they don’t necessarily impede progress with science or medicine. But they nonetheless minimise harm to animals. So they fit quite well with my personal perspective on the use of animals in research and very many organisations from different parts of the perspective can see the benefits and will give support to the Three Rs. So they’re useful as a concept which is *quite widely accepted* in this quite difficult field.” (NC3Rs)

What these examples allude to is the perceived ability of the Three Rs to bring different sides together. This dimension is briefly considered in chapter 14 of the Nuffield report, which claims that despite significant moral disagreement, “any society needs to settle on a single policy for practical purposes” (9). According to the report, instability, protest and civil unrest could ensue if this policy is out of line with many people’s beliefs. The report then asks whether the Three Rs are broadly accepted by all positions in the debate. The answer is complex, but the report claims that “practical advances in scientific methods can reduce areas of conflict. For this reason, the importance of the Three Rs, and especially the need to find Replacements, cannot be overstated” (10). In other words, the concept is valued, not only for its ability to crystallise or encourage good ethics or good scientific practice, but also for its *ability to forge consensus*.

However, it is important to appreciate that, for some campaigning groups, it is precisely this ability to create consensus which illuminates a political tension. To quote just one example:

“I think the Three Rs is undoubtedly useful in reducing animal suffering to an extent....Again, we’re an abolitionist organisation that wants to see an end to all animal experiments, but if people are going to make moves which reduce the amount of animals used or reduce their suffering, then that’s welcomed in the short-term...How, again this is a discussion that is kind of being had... within the movement at the moment, is the Three Rs an obstacle to actually achieving what we want?” (PETA)

In summary, this section has highlighted that the Three Rs can be conceptualised as a political animal. The apparent ability of the Three Rs to forge consensus will be regarded as a positive by some and a challenge by others. Of course, there is still the question of whether the Three Rs do actually represent what philosophers call the ‘moral consensus’ (11), or even a public consensus. Detailed empirical work would be needed to fully do justice to this question. As I have noted elsewhere (12), there are numerous problems with assuming that poll data can adequately capture public attitudes to non-human animals, or to animal research. Overall, more academic consideration of the political history of the Three Rs in the UK debate would be valuable. Nevertheless, what is apparent from the interview data is that The Three Rs, not only operates as an ethical or scientific concept, it is also conceptualised as a political animal.

Conclusions

The aim of this paper was to reflect on *The Principles of Humane Experimental Technique*, and explore how contemporary stakeholders in the UK debate talk about the Three Rs. There are three main conclusions.

The first relates to the ‘ethical’ status of the Three Rs concept. Despite Russell and Burch’s careful definition of humane, the study found some use of the Three Rs as a kind of ethical criterion. Other stakeholders revealed how the Three Rs can be viewed as a route to managing the ethical dilemma caused by the use of laboratory animals. Of course, this point would be challenged by those who appear to deny that animal research represents an ethical dilemma (13). For others who question the morality of all laboratory experiments, the Three Rs concept is also likely to be regarded as a flawed — or at least limited — summary of human ethical responsibility towards non-human animals.

The second conclusion is that researchers who use animals do claim to see *replacement*, *refinement* and *reduction* as part of good scientific practice. This is positive news for those who want to see the concept embedded as a norm within the domain of laboratory science. However, the study also illustrates the risk that researchers will feel that their status or professional identity, as scientists, is being undermined by the perceived imposition of concepts like the Three Rs.

The third conclusion is that stakeholders conceptualise the Three Rs in political terms. Given the traditional media focus in the UK on the tactics of intimidation of a small minority of protesters, it is perhaps not surprising that the idea of consensus and the ‘middle ground’ is so highly prized by some. However, such a consensus will also be seen by others as a potential barrier to more-radical policy change.

Overall, the analysis suggests that the Three Rs are being conceptualised in at least three ways. There are undoubtedly more — one could, for example, analyse how the Three Rs are understood as a *legal* animal. So what are the main implications of this conclusion?

On the one hand, observers may bemoan the apparent lack of consistency that this paper reveals. One implication is that stakeholders should seek to clarify their own conceptualisation, and decide what kind of concept they want the Three Rs to become. We may then discover that some of the debate is not about the detail of particular replacements, refinements or reductions, but is rather a difference of opinion or frustration about precisely what it is that is under debate — is the Three Rs concept an ethical shorthand, a scientific norm or a political compromise? In theory, greater clarification could eventually increase the quality and nuance of the debate about animal research.

On the other hand, we may decide that a lack of clarity is not something to be feared. Indeed, the apparent inability of the Three Rs to be easily classified, partly explains why the concept remains resonant 50 years after its publication by Russell and Burch. Despite the structure of this paper, what the data allude to is the profound interrelationship between the domains of ethics, science and politics. For example, the scientific investigation of disease is based on an ethical assumption about the value of health, and a political assumption about how best to allocate scarce resources. The implication is that laboratory animal research, like all research, is best understood as a hybrid activity. It is not surprising, then, that the Three Rs concept has itself become conceptualised as a kind of hybrid animal.

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