they limited their analyses to "two shots per shooter per regime … to avoid practice improving their performance", yet the probabilities presented in Table 2, which in their own words were the main focus of their study, utilise data from all the shots fired, with shooters apparently firing up to five shots in some regimes.

Applying the Central Limit Theorem in this manner is also reliant on the second fundamental assumption that all individual (Bernoulli) trials have a constant outcome probability. For example, in an analysis of the effect of shooter skill level on the likelihood of 'killing' the fox outright, there must be a constant likelihood between (independent) trials that each shot results in a 'kill'. This presumption of constant probability is not expected where data have been pooled across regimes that vary in the types of ammunition used, distance to target etc; comparing the probabilities listed in Table 2 (Fox *et al* 2005a) for skilled shooters firing rifles, the probability listed for kill shots ranges from 40% to 90%. Indeed Fox *et al* (2005a) themselves implicitly concede that this profound variation is present in the data they have pooled, because they subsequently analyse these data to determine the effects of these other factors! Even had this approach been valid, the authors appear to have overlooked the possible problem of non-equality of variances; this is particularly relevant where the outcome probability is high or low, as this leads to skewed distributions of points. Therefore, in summary, the authors have failed to conform to the fundamental basic assumptions of the statistical approach used to collect and analyse their data, rendering their conclusions of little or no value.

Although we agree that there may be a number of practical issues to address when implementing a thorough scientific examination of the impact of factors associated with wounding in foxes, these problems are not insurmountable. Certainly, given the political sensitivity of the issue being investigated, they are not a valid excuse for the limitations present in Fox *et al*'s (2005a) study. For example, the approach that we suggested (Baker & Harris 2005) could easily be designed to account for the potential problem of improving individual performance across regimes by (1) allocating participants to regimes in a random order, and (2) including an additional variable that would indicate the temporal sequence in which individuals completed regimes, ie trial number; both approaches are common statistical practice. Although such a study would require careful planning and the use of large numbers of participants, it would generate a balanced, rigorous, robust and statistically valid data set on people's ability to hit paper targets. Whether this has any relevance to the situation in the field is another issue.

In conclusion, and to borrow a set of phrases from Fox *et al* (2005b), the wider scientific community can see that the issues we have highlighted are not statistical fine detail but are over-riding violations of the fundamental basic properties of the analytical procedures utilised. As such, any conclusions derived from such an analysis can be seen to be seriously flawed. Furthermore, by their own admission, Fox *et al* (2005b) "[do not claim] that the majority of the shooting regimes tested 'reflect practices actually occurring in Britain'", that the regimes tested "were not intended to represent the spectrum of regimes used in real life, because nobody knows what they are", that "real life is seldom as tidy as controlled trials" and that "the real crux of the matter is the motive of the shooter, which we could not measure"; therefore, one has to question the meaningfulness of a study in which one attempts to enhance our understanding of this issue by testing a series of practices that may or may not be occurring (and hence their relative importance) in the wider countryside, using a technique that may or may not reflect the true outcome of these practices, but which does not (apparently) examine the fundamental issue. As these authors say, "the key issue is the animals that escape wounded", but we believe their study makes little contribution to further our understanding of this welfare issue, not least because they limit their study to a single shot, whereas in the field a high proportion of wounded foxes (probably a large majority) will be swiftly dispatched with a second shot.

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Response to Baker and Harris' letter 'Still shooting in the dark'

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We are glad that Baker and Harris (2005) accept that our Table 2 (Fox *et al* 2005a) does outline the probabilities that we claim in our study, and that presumably they also accept the other points we explained in our last letter (Fox *et al* 2005b).

Although the most accurate or most appropriate way to analyse these results, whether by the method we have used or by a multivariate approach proposed by Baker and Harris, will no doubt remain an area of contention, the results in Table 2 speak for themselves.

However, Baker and Harris's complaints of our statistical treatment are unjustified. They accuse us of pseudoreplication by artificially doubling our sample size because we allowed

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each shotgun shooter two shots per regime. Their claim that these two shots are not independent is wrong; they obviously have no experience of shooting. The two crossing shots are not of equal difficulty: a right-handed shooter finds a target travelling from right to left easier than one in the opposite direction (Churchill 1971, p 225). Our study was designed to balance this out as well as to prevent discrimination against right- or left-handed shooters.

Similarly, our claim that shots were limited to two per shooter per regime to avoid practice improving their performance at moving targets is correct. For static targets, in which rifles were used, each shooter was allowed five shots per regime because there was no movement for the shooter to adapt to.

Finally, Baker and Harris question the relevance of our study to real life practice. The answer to this is simple: although nobody knows the exact spectrum of regimes currently used to shoot foxes in the UK, we *do* know that most of the regimes we tested are in common use, and that all are legal and are used in UK. Until all shooting of wild foxes is properly documented (which it never will be), all experimental studies will face this issue, but this should not deter us from attempting to investigate wounding rates. The British Association for Shooting and Conservation (Harradine 2005) have attempted to quantify this relationship: "BASC's research shows that, in following the (BASC's) code's advice, using the most appropriate cartridges and ranges, more than one shot if required, and effective dogs, the wounding loss rate of foxes is under 10%". Harradine has so far been unable to explain to us his protocol and statistical approach for investigating the use of additional shots and the use of 'effective dogs' in reducing wounding rates and, again, we await with interest the publication of this study in a scientific journal. If published, our first question will be 'How do you know that in real life all foxes are shot under these ideal conditions?' Obviously in our study we have not dared to make an estimate of real life outcomes because we could not devise a protocol for measuring the effects of multiple shots or the use of dogs, but if (and it is a big 'if') one accepted BASC's claim of 'under 10%' escaping wounded under optimal conditions, how does this compare with other ways of killing foxes, such as snares or using dogs without guns?

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