

## WHY WE DO IT THE HARD WAY: OBSERVATIONAL STUDIES TELL A DIFFERENT STORY FROM QUESTIONNAIRES

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### **ABSTRACT**

*When analysing humans, issues of bias are a major concern affecting the validity of research. Objectivity is never guaranteed since we are observing conspecifics. Questionnaire studies aggravate the problem by adding additional sources of data filtering and bias. This article provides a short outline of the steps that need to be taken in order to ensure that data collected in observational studies are valid. It is aimed to raise awareness for the requirements of observational studies in order to meet the standard definition of ethology, and describes the limits and potential of observation in comparison to questionnaire studies.*

**Keywords:** *Behaviour observation, bias, ethogram, ethology.*

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### **IT IS IS EASY TO ASK QUESTIONS, BUT SHOULD WE?**

Humans maybe are the most interesting of all animal species, but their behaviour might also be the most difficult to study. Observing ourselves bears some pitfalls that have to be avoided carefully. In all sciences dealing with human subjects, lack of objectivity is the

greatest danger to scientific integrity. When we employ questionnaires to gain insights into human behaviour we deal not only with the human bias of the scientist, but with the self reflection on the behaviour that might result in filtered disclosure by the subjects. Self reports can be inaccurate for a number of reasons, resulting in different effects on data quality:

*Social desirability:* Probably the best-known distortion effect in self reports is the under reporting of socially less desirable behaviours and the overemphasis of socially desirable behaviour. This is likely because we do so in our everyday behaviour. We tend to brush over the things we appreciate less about ourselves and be focus on our achievements.

*Resolutions:* We know that we should be more active, eat more healthily and so on. We have a specific idea of how we want to lead our lives, and when asked how we do, we tend to shift our answers toward our intentions, rather than to report truthfully that we had that bar of chocolate or did not go for a walk every day.

*Ignorance:* Many of the things we do are not actions following deliberate intentions, but happen without much thought. When asked to report on our actions and the motivations behind those actions, we will provide answers, unaware of the fact that these *post hoc* reports might have nothing to do with what actually happened.

*Dishonesty:* Sometimes people might intentionally lie, either to draw a more favourable picture of themselves or to actively misinform.

These sources of inaccuracy play a role whenever subjects are asked to report on their behaviour, their motivations for behaviour or their intended behaviour. There are means to assess the general tendency to distort and fake answers in questionnaires, but they are useful only to identify the individuals with the least accurate answers, and they do not address the general problem.

## **WHAT WE NEED TO KNOW ABOUT OBSERVATION**

Observational studies remove these sources of data distortion. They provide more direct access to what actually happens. This does not mean that observing behaviour is objective, and does not allow for biases. Richer (2017) describes in detail how our perception is shaped by our expectations and offers advice how to deal with this It is essential to follow some basic rules when observing behaviour.

The behaviour repertoire of humans is very large. Practical considerations require that we reduce the behaviours observed in a given study to an ethogram representative of the behaviour in the investigated setting. This reduction carries with it a danger: By eliminating certain behaviours while including others, one might overlook relevant behaviours. How do we make the decision what to incorporate in the ethogram and what to leave out? One approach would be to rely on reports in the literature and to focus on behaviours reported to be of relevance for the research question. While this might optimise the ratio of effort and detected effect, it blinds us for behaviours that have not been investigated before, as we might not include them in the ethogram. Another

possibility would be to start with a questionnaire approach and validate those findings with behaviour observation (Fisher, 2017). This might introduce new ideas, but overlook behaviours that escape our awareness, like for example body manipulators or social grooming (Nelson & Geher 2007).

A data-driven approach reduces the risk of perpetuating previous oversights. The first step towards the development of an ethogram is a thorough *ad libitum* observation. This results in unstandardised notes about observed behaviour. From the very beginning, the ethologist is advised to refrain from the use of functional interpretations and to describe the processes as objectively as possible. Based on the notes of the *ad libitum* observations, a first draft of the behaviour catalogue is designed (Hendrie, 2017).

The behaviour categories included in the catalogue must be defined in an unambiguous fashion, in order to be universally valid and reliable. Usually, the development of a useful set of behaviour categories requires several iterations that include rephrasing of the definitions and repeat recordings by several observers. This process is concluded, when the reliability of recordings meets the standard requirements of ethological research. (For detailed instructions for the development of a behaviour catalogue refer to Lehner, 1996).

One major issue in behavioural sciences is that categories are not necessarily termed in a manner that is understood universally. One example of a behaviour complex being called many different names is auto manipulators:

In literature on nonverbal behaviour, the terms used for body manipulation movements are numerous, while referring to largely the same behaviours: self adaptors, and other movements directed towards the own body, such as rubbing the face, scratching or playing with one's hair, touching the face, putting a finger in the mouth, picking one's nose, touching the head, holding one hand in front of the face, touching the upper body and adjusting the hair (Table 1).

**Table 1:** Summary of terms used to refer to body manipulation behaviour.

Author and Year	Terminology
Rosenfeld (1966)	Self manipulation
Freedman and Hoffman (1967)	Body-focused movements
Ekman and Friesen (1969, 1972, 1977)	First self adaptors, then body manipulators
Knapp, Hart and Dennis (1974)	Self adaptors
Stokols, Smith and Prostor (1975)	Self manipulation
Le Compte (1981)	Hand-to-body-or-face movement
Ruggieri, Celli and Crescenzi (1982)	Self-contact gestures
Harrigan (1985, 2005)	Self touching and self adaptor
Renninger, Wade and Grammer (2004)	Auto manipulations

Auto manipulators produce sensory stimulation and are performed to relieve tension or bodily needs (Ekman & Friesen, 1974). They are performed with little or no awareness (Ekman, 1977), but highly regularly and at specific points of social interactions (Harrigan, 1985). They usually do not seem to be employed as express communicative tokens, despite conveying diffuse information. Auto manipulations stimulate proprioceptors and sensory perceptions. This way they can relieve or intensify bodily tension (Freedmann, 1972). Auto manipulation rates are higher in stressful settings than in relaxed settings (LeCompte, 1981), which leads to the suggestion that auto manipulations act as a stress-reducing mechanism (Stokols, Smith, & Prostor, 1975). Close proximity to unknown persons increases the frequency of auto manipulations (Givens, 1987). Being surrounded by familiar people might have the opposite effect.

The development of an instrument for behaviour observation requires repeat refinement of the definition of the behaviours, until the reliability standards are met. A behaviour must be observable in a manner that allows for high precision and accuracy. Being precise alone is not enough, as this might still mean that you miss the target. Precision describes the degree to which the same behaviour is recorded in the same way. Precise recordings could still be wrong, for example through an error of comprehension by the observer: If an observer thinks that a person who stands still is walking and vice versa, this observer will likely recording with high precision, but no accuracy as to the usually understood meaning. It is therefore necessary to validate the behaviour categories not only within the research group, but in a more general manner. Intra- and inter-observer reliability refer to similar qualitative aspects of behaviour annotations. Intra-observer reliability measures to what extent one and the same observer will describe the behaviour in the same manner in repeat observations. Inter-observer reliability measures the agreement among different observers.

Information on the reliability of the behaviour recordings has to be provided in the publication, as it describes the likely measurement error. Like with any other measurement tool, it is necessary to know how big that error is relative to the reported effect sizes, to allow for an interpretation of the results (Martin & Bateson 1993). If the effect sizes are not substantially larger than the measurement error, the results might be due to chance rather than real effects.

Once the ethogram is completed and validated, data collection can commence. Throughout the study, the observer must remind themselves that in observing conspecifics we are highly vulnerable to observer bias. So steps must be taken to keep this bias to a minimum. The data collection is best carried out by observers who are blind to the research question. Keeping the purpose of the study hidden from the people collecting the data helps to reduce bias specific to the study, while the general observer bias can never be completely eliminated.

The most important consideration to reduce bias is how the behaviour categories are described in the ethogram. The more the description sticks to technical and movement characteristics, the better. Any functional and goal-oriented references are best avoided. Observers should not know the observed subjects, and the observation period should be kept short, so no observer expectancy and drift can develop. (Martin & Bateson 1993)

Taking all these considerations into account means putting a lot of effort into the data collection. Usually, an observational study makes high demands on time and financial resources, especially when compared with questionnaire studies. Nonetheless, it is worth

to investing into ethological studies, as not only the data are likely to be less biased, but they can address questions that are not accessible to questionnaire studies: behaviour that is exhibited unconsciously, like body manipulators or social touch, will be under reported in surveys. Only by observing closely are able to gain insights into these behaviours.

While doing a proper observational study might look daunting because of all the requirements, the insights gained will make it worthwhile. Done properly, ethology can be one of the most rewarding approaches to understanding human behaviour.

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