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**Reply to Durkee: “Do the Maasai perceive weak walkers to be stronger and more attractive than strong walkers? A re-analysis of Fink et al. (2019)”**

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Handgrip strength (HGS) may be a Darwinian fitness indicator in human males [1]. Research with Western samples suggests that gait conveys information about male physical strength, as assessed by handgrip strength (HGS). Women more than men judged the gait of strong walkers higher on attractiveness (and strength) [2,3]. These findings were obtained with samples from Chile, Germany, and Russia by collecting assessments of featureless virtual characters, animated with the motion-captured walk movements of young British

men, pre-categorized into strong vs. weak walkers based on HGS. Thus, Fink et al. [4] hypothesized that across countries men and women can assess male strength from gait (although they differ in attractiveness assessments of strong and weak male walkers), and that attractiveness assessments of male gait may be affected by society-specific emphasis on male physical strength.

To further explore these hypotheses, Fink et al. [4] presented the stimuli used in Chile, Germany, and Russia [2,3] to men ( $n = 51$ ) and women ( $n = 49$ ) of the Maasai population in the Ngorongoro Conservation Area in Tanzania (Africa). In contrast to the results of previous studies with Western samples, Maasai men and women judged the gait of strong (British) men less attractive (and weaker) than those of weak men. Durkee [5] presents a re-analysis of these data and concludes that these unexpected results could be due to the increased likelihood of false positives, in consequence of averaging across groups of stimuli (i.e., the means for “strong” and “weak” walkers, respectively). Durkee’s [5] re-analysis, using a mixed-modelling approach (i.e., an ordinal mixed-effect model), performed separately for attractiveness and strength assessments, indicates “no difference” in judgments of strong and weak walkers. Durkee [5] also addresses the lack of statistical power in Fink et al. [4] attributable to pre-categorization (by HGS) and selection of a subset of stimuli ( $n = 20$ ) from a larger sample of male walkers. Durkee’s [5] re-analysis produces a positive association of attractiveness and strength perception in the Maasai.

We are aware that reliance on statistical averages has limitations, as outlined by Durkee [5], and although it is common practice in many disciplines, researchers should consider such reports with caution. Many scholars are not familiar with more advanced statistics, however, and therefore continue to report results based on a narrower set of central tendency measures, perhaps because they are more readily accessible for

interpretation of study findings. To address this limitation, we performed an ordinal logistic regression on raw scores, in addition to the more familiar Wilcoxon signed-rank tests based on (by-participant) aggregated data. The results revealed substantively similar results, with effects for both dependent variables (attractiveness and strength). Durkee [5] performed an ordinal mixed-effect model on the total sample (men and women combined) and concludes that there are no significant differences in Maasai attractiveness and strength assessments of strong and weak walkers. Thus, it seems that whether a statistically significant result is obtained depends on the choice of model.

We are reminded of the suggestion that “crowdsourced research” can balance discussions and validate findings [6]: Twenty-nine research teams analysed data addressing the association of soccer players’ skin colour with the tendency to be given a red card with different analytic techniques and arrived at different results. Collaborative “crowdsourcing” [6,7] is an interesting but demanding initiative to address certain research problems, but it cannot disengage researchers from important decisions about hypotheses and the interpretation of study data. This includes the consideration of the context and conditions under which data are collected, in addition to the biology relevant to the issues. We were challenged with the question as to whether in the Maasai the finding of weak walkers being judged more positively is plausible. Durkee’s [5] re-analysis suggests caution in interpreting this result, which certainly requires replication, in addition to careful consideration of the choice of statistical analysis. However, considering this present and previous reports, our conclusion is that there may be culture-specific variation in the assessment of male strength from gait, such that, in contrast to other societies, the Maasai may be less concerned with physical strength but emphasize endurance-related traits, given their semi-nomadic pastoralist lifestyle and socio-cultural settings.

Fink et al. [4] did not find considerable evidence for effects of sex and age on gait assessments. Durkee [5] performed his re-analysis on the total sample, and it is not clear whether sex and age were considered in the mixed-model approach. Previous studies in Western samples [2,3] reported differences in the assessment of strong vs. weak walkers for women (but not men). Considering these factors in the analytic approach may account for differences in the results with regards to conventional levels of significance (0.05) [6,7]. Taking the results of our analysis together with the results reported by Durkee [5], we contend that the interpretation should be that the Maasai perception of strength from gait may not follow previously reported patterns in Western samples. Whether this finding extends to other pre-industrial societies is unclear and needs to be investigated. In this regard, we concur with Durkee [5], including the suggestion to replicate the study by extending the variation in body movement information (and not focus on extreme groups), and thus increasing statistical power, as we have previously done in laboratory-based studies [8,9]. Compared with laboratory settings, fieldwork can be challenging with regard to logistics and respondent fatigue, and this was the primary reason for the selection of extreme groups in the present study. Yet we think that such differences in experimental standards should not prevent scholars from conducting investigations in non-Western societies, as these data provide an important contribution to our understanding of biological influences and socio-cultural effects on human behaviour.

### **References**

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