Sensory discrimination testing with the sensR package

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Development of the *R*-package **sensR** [1] was motivated by problems in modeling sensory and signal detection theory (SDT) discrimination tasks. On a basic level **sensR** provides the means for standard discrimination testing, d-prime estimation and sample size estimation in sensory discrimination protocols such as the Triangle, Duo-Trio and Alternative-Forced-Choice tasks. Other commonly used testing protocols like A-not A (Yes-No), Same-Different, Paired preferences optionally with a no-preference option are also supported with estimation, profile likelihood and power estimation functions.

On a more advanced level **sensR** facilitates modeling of psychometric and sensory discrimination experiments with generalized linear models (GLMs) where special purpose link functions derived from the psychometric functions for the discrimination protocols directly relate the probability of success to the underlying Thurstonian d-prime [2]. Family objects to be used with `glm()` unleash the full power of GLMs facilitating in-depth modelling via the linear predictor, profile likelihood intervals of parameters with psychometric interpretations and much more.

The **sensR** package also facilitates analysis of ordinal ratings in the context of the Degree-of-Difference test and A-not A with sureness (yes-no rating) tests. This is partly obtained by interfacing the **ordinal** package [3]. Power estimation functions are also provided in the ordinal setting. In addition, support is provided for replicated tests via Beta-Binomial and chance-corrected Beta-Binomial models, ANOVA-like models for d-prime values with posthoc testing, as well as ROC curves and AUC facilities.

References

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[2] Brockhoff, P.B. and Christensen, R.H.B. (2010). Thurstonian models for sensory discrimination tests as generalized linear models. *Food Quality and Preference*, **21**, pp. 330-338.

[3] Christensen, R. H. B. (2014). **ordinal** - Regression Models for Ordinal Data, *R*-package version 2013.10-31, `http://www.cran.r-project.org/package=ordinal/`.