Figure 1: A diagrammatic presentation of the classification of the Bayes Factor 26 .

The picture provides evidence for null and alternative hypotheses depending upon the values of the Bayes Factor. Bayes Factors =1 explains equal support for both hypotheses. Bayes Factors greater than 1 and below 3 are considered as weak evidence for H1 and more than 10 are cons ideredasstrong evidence for H_1. The ratio of white (supports H_o)to red (supports H_1)is a surf ace of theBayes Factor 26.

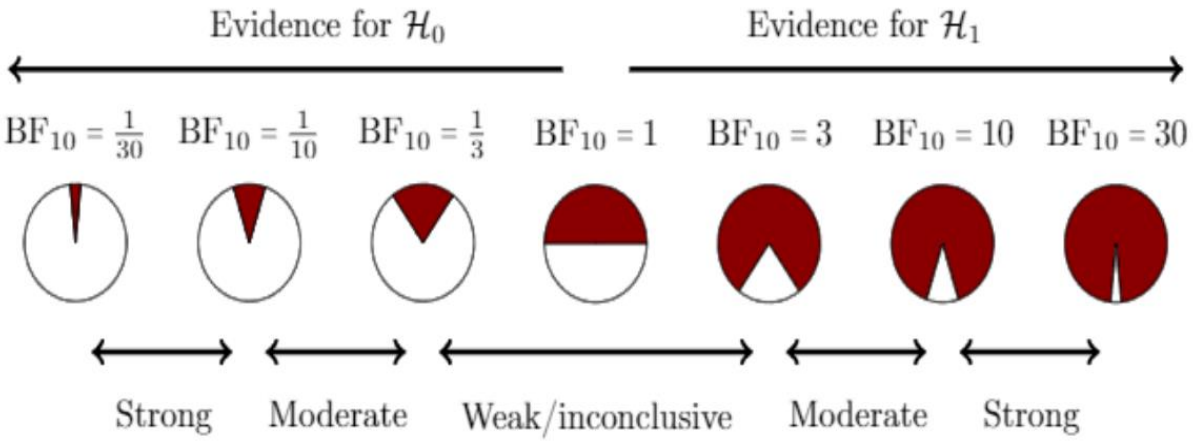

Figure 2: Bayesian one-sample proportion test for the parameter θ.

The proportion of smokers for the 15-69 years population in STEPs Survey 2019 (P1= 17.1 %, n= 5593) was compared with smokers of the same age group in STEPs Survey 2013 (P_o = 18.5%, n=4200, the effect size (δ): Ho = 18.5 vs H_- < 18.5). The probability wheel on top shows the large area of the wheel covered in white color in favor of Ho. The two gray dots indicate the prior and posterior density at the test value (18.5% vs. 17.1%,) and indicate in favor of the null hypothesis (the prior line is below the posterior line). The posterior median effect is 0.183 (95% CI: 0.173-185). Smoke-1 means those who smoke a tobacco product.

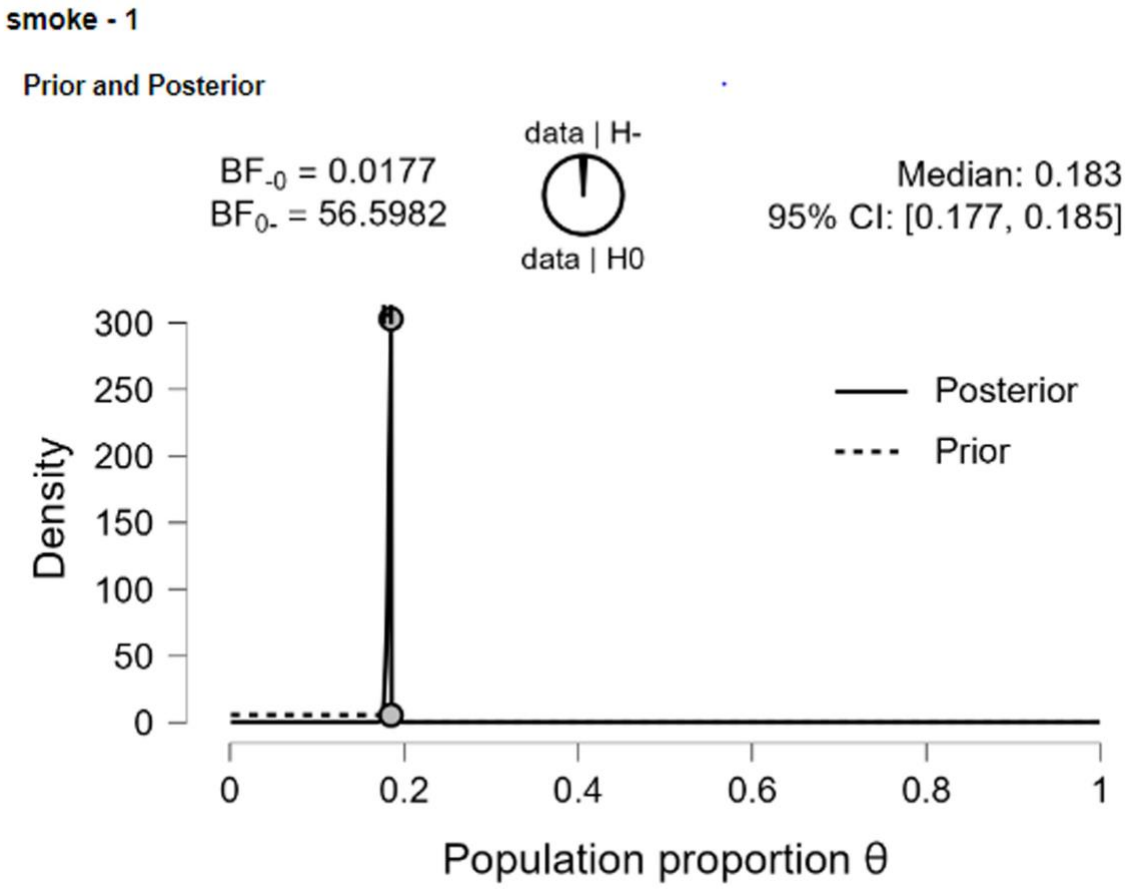

Figure 3: Sequential Bayesian Analysis of the proportion of tobacco smoking between STEP Surveys 2019 and 2013.

The x-axis represents the sample size and the y-axis represents the magnitude of the Bayes Factor. Each point in the plot represents a change in the Bayes Factor caused by the addition of a participant in the analysis. The figure also shows the progression of the Bayes Factor in favor of the null hypothesis for the number of participants increased in the analysis. The very strong evidence supporting the Ho is displayed on the probability wheel at the top where a large portion of the wheel is colored white. Test value (H_o) was set at the prevalence of smoking (p_0= 18.5%) at the STEP Survey 2008 and compared with the prevalence of smoking (p_1=17.1%, n=5593) at the STEP Survey 2019.

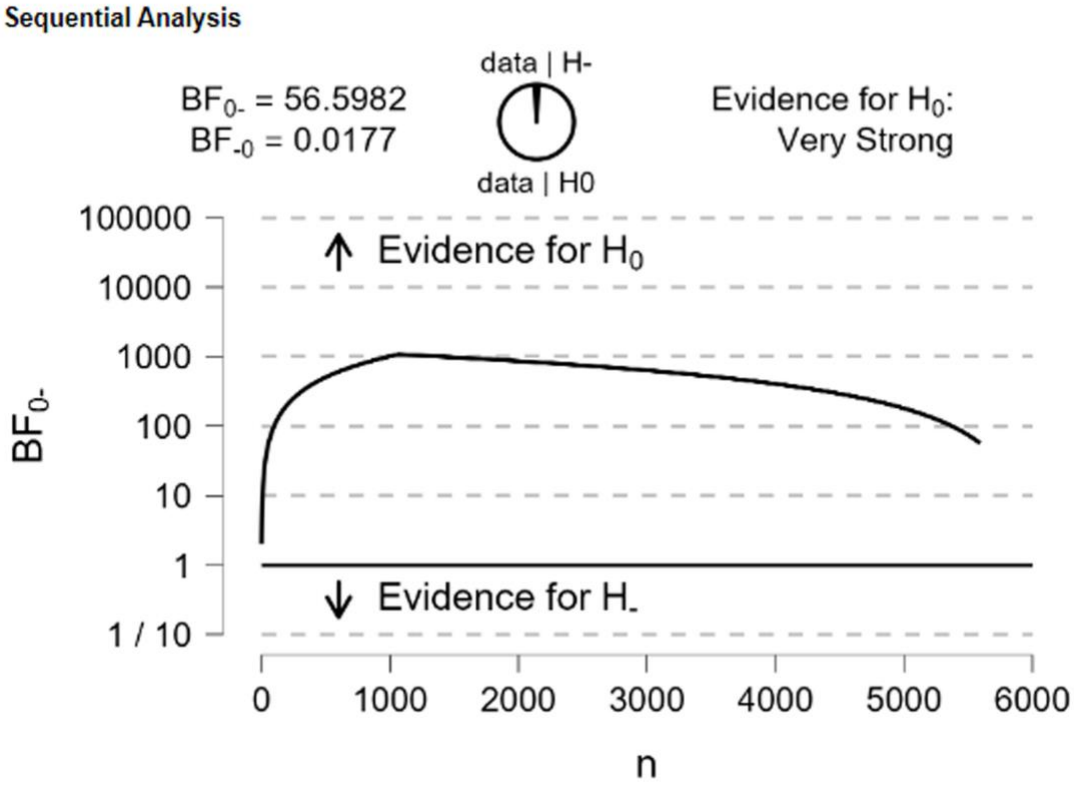

Figure 4: Bayesian one-sample proportion test for the parameter θ.

The proportion of smokers for the 15-64 years population in STEPs Survey 2019 (P1= 16.6 %, n= 5281) was compared with smokers of the same age group in STEPs Survey 2008 (P_o = 26.2%, n=4328 the effect size (δ): H_o = 26.2% vs H_- < 26.2%). The probability wheel on top shows the evidence in favor of alternative hypothesis H_1 (large area of wheel covered by red color for H_-). The gray dot of the prior line is above that of the posterior line indicating in favor of the alternative hypothesis (26.2 % vs. 16.6%). The posterior median and its 95% central credible interval is 0.182 % (95% CI: 0.172-0.193%). Smoke-1 means those who smoke a tobacco product.

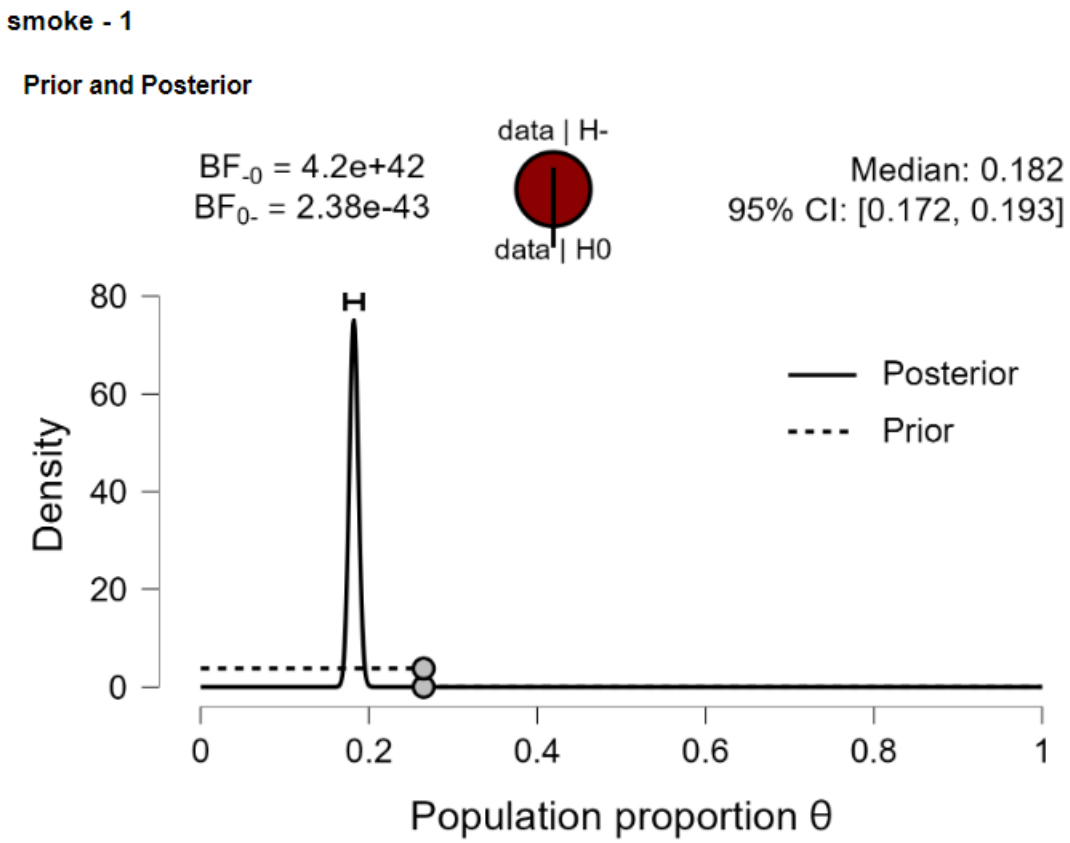

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Figure 5: Sequential Bayesian Analysis on smoking prevalence between STEP Surveys 2008 and 2019.

The x-axis represents the sample size and the y-axis represents the Bayes Factor's magnitude. Each point in the plot represents a change in the Bayes Factor caused by the addition of a participant in the analysis. The figure also shows the progression of the Bayes Factor in favor of the null hypothesis for the number of participants increased in the analysis. The probability wheel's nearly 100% red area denotes the most convincing evidence in favor of the alternative hypothesis (H-), which is the decrease in smoking prevalence rates between 2008 and 2019. Test value (Ho) was set at the prevalence of smoking (p_0= 26.2%) at the STEP Survey 2008 and compared with the prevalence of smoking (p_1=16.6, n=5281) at the STEP Survey 2019.

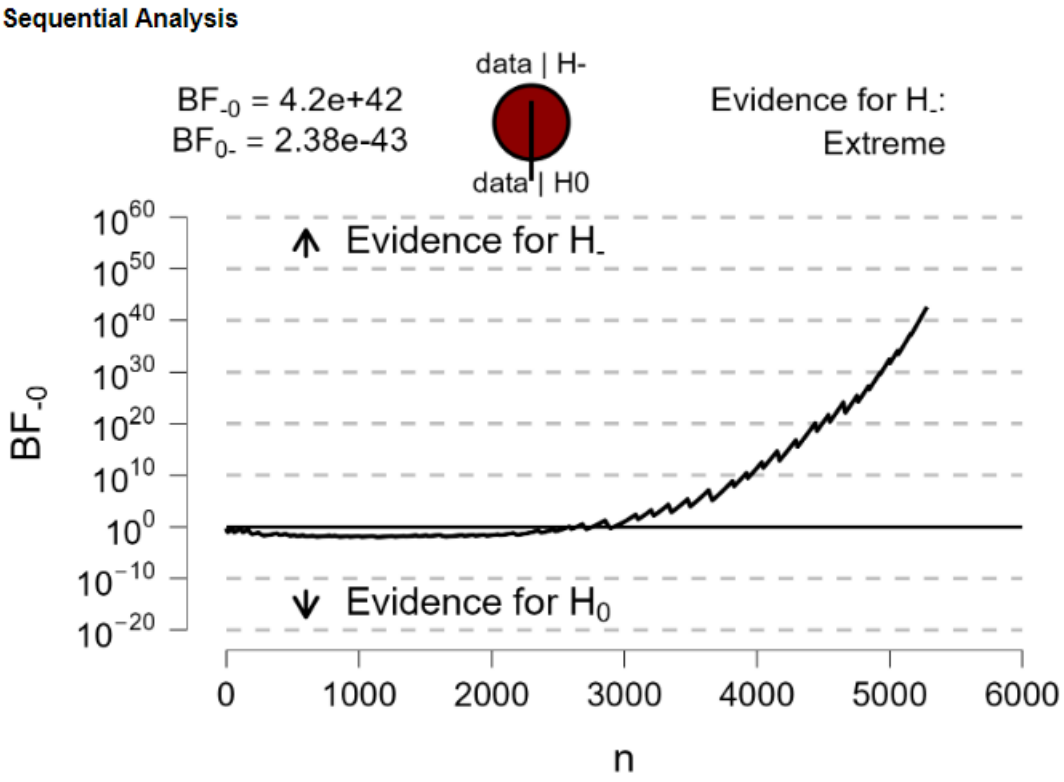

Figure 6: Raincloud plot showing the distribution of the age of smoking initiation among the male and female respondents, STEP Survey 2019.

The raincloud plot shows how the raw data of age of smoking initiation for males and females respondents (the rain) are distributed and overlaid probability distribution curve (the cloud). Further, Boxplot and curve confirm the distribution of raw data is right-skewed with outliers and extreme observations. The value of skewness is +1.79 and + 1.87 for males and Females respectively beyond ±1.

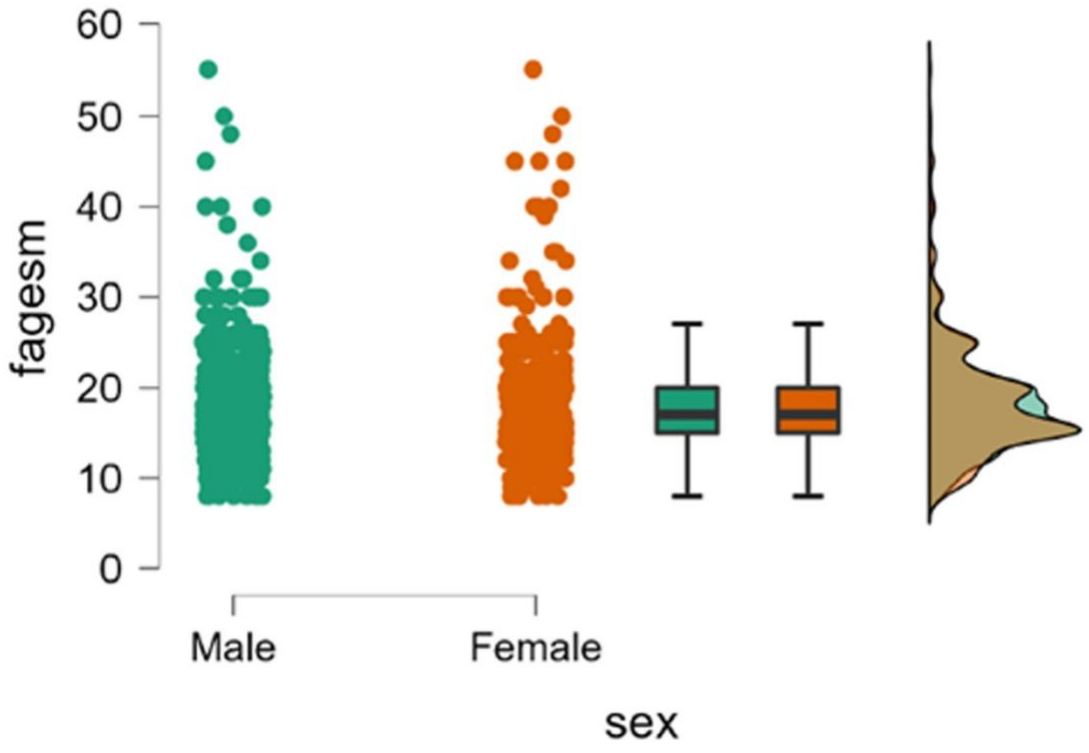

Figure 7: Raincloud plot showing the distribution of log age of smoking initiation among males and female respondents, STEP Survey 2019.

The raincloud plot shows the raw data of the log age of smoking initiation for male and female respondents (the rain) with an overlaid probability distribution curve (the cloud). Further, Boxplot and probability curve confirm distribution of raw data is symmetrical with few outliers. The value of skewness for males and females is 0.18 and 0.38 respectively which lies within ±1.

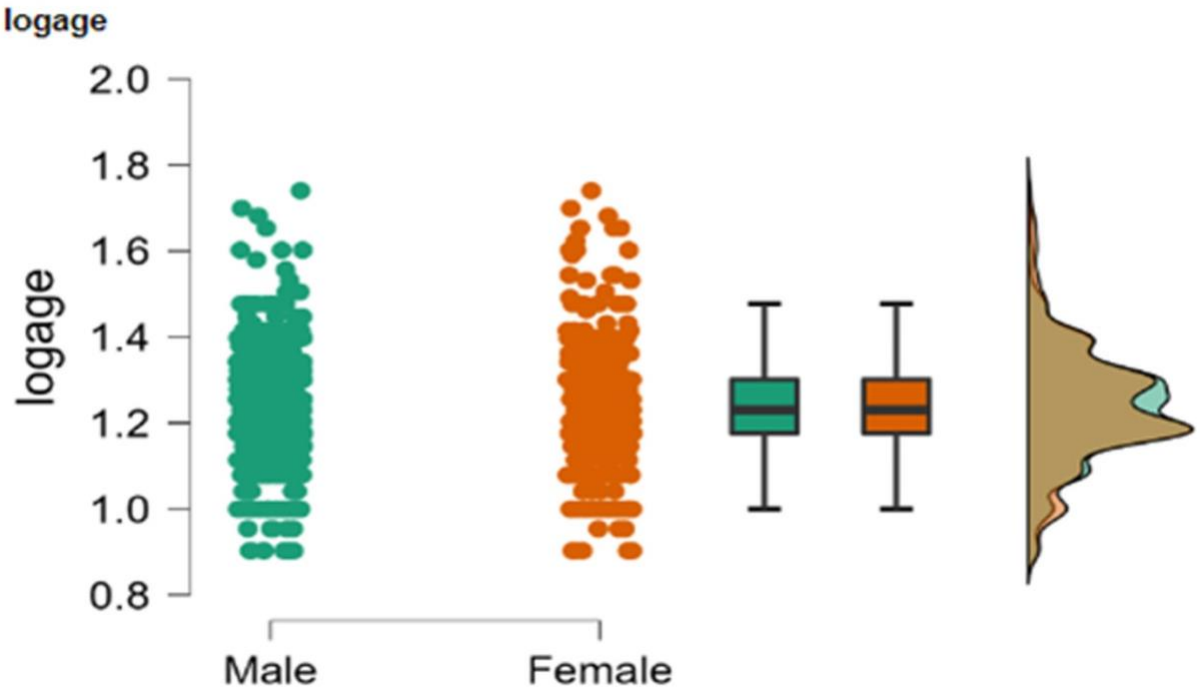

Figure 8: Bayesian two-sample t-test for the effect size for the difference in mean log age of smoking initiation for males and females of δ.

The log mean age of smoking initiation was 1.23 and 1.24 for males and females respectively. The probability wheel on top shows the evidence in favor of null hypothesis H_o because the large area of the wheel is covered in white color. The two gray dots indicate the prior and posterior density at the test value (1.23 vs. 1.24). The median effect size was -0.029 with a 95% credible limit of -0.154 to 0.096.

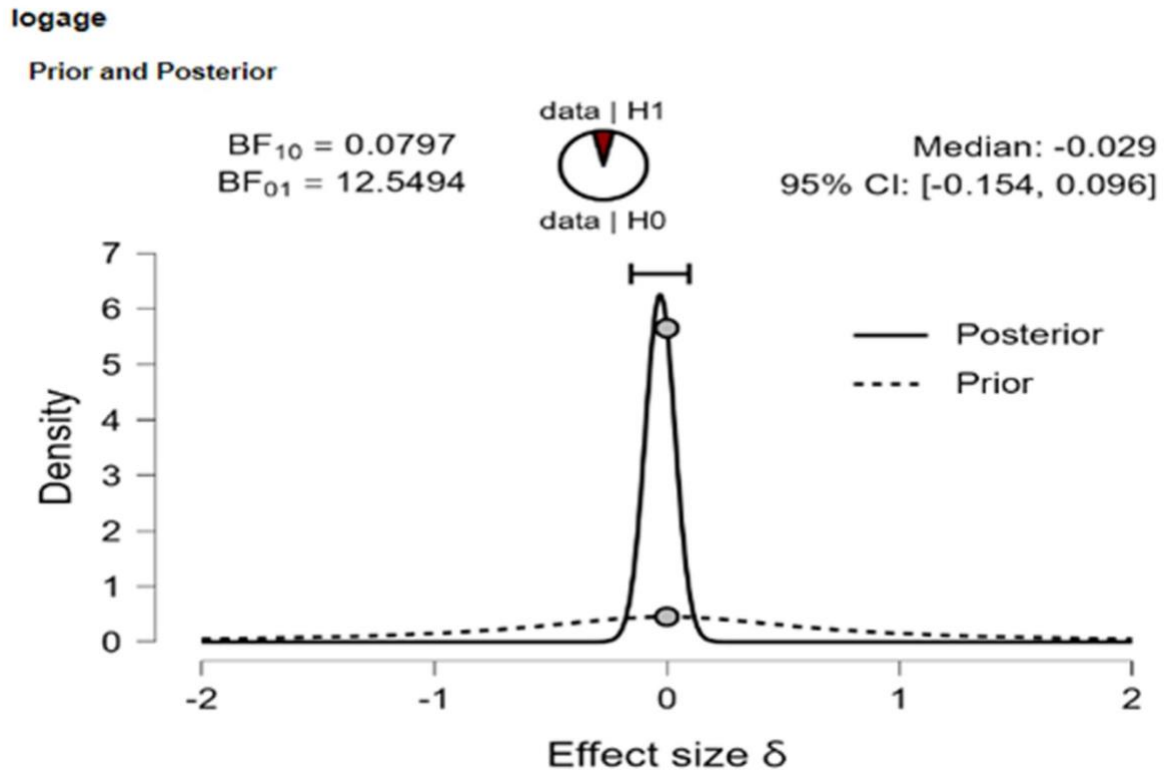

Figure 9: Plot showing the value of BF_{01}, for mean log Age of Smoking Initiation between males and females, as a function of the width (i.e., scale, or γ) of the Cauchy prior.

The different color dotted line represents the default prior distribution for the population effect size δ (difference of mean log AOI between males and females) with a different Cauchy prior scales (a user-prior (r = 0.707), a wide prior (r = 1), and an ultra-wide prior (r = 2 = 1.414). The arrow indicates ranges in which the BF_{01} shows there is strong evidence for H0 (BF_{01}>1).