

Data analysis in RStudio: Comparative communication. Study 1: Initial appraisal of implicit and explicit differences. Extension: The role of group membership

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Abstract

Keywords: keywords

Word count: X

Data analysis in RStudio: Comparative communication. Study 1: Initial appraisal of implicit and explicit differences. Extension: The role of group membership

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Data analysis

Dataset. I conducted the analysis using the data sets Study1_ready_yujing_1a_short.sav and Study1_ready_yujing_1b_short.sav.

Gender groups. The cleaned dataset comprised of 128 male subjects and 129 female subjects.

Age groups. Our subjects comprised of 73 younger people, 108 middle-aged people and 71 older people. Among them, 4 younger subjects and 21 older subjects identified themselves as middle-aged. None of the subjects identified with the “wrong” age group (younger participants identifying with older people, or older participants identifying with younger people).

Analysis plan

Main effect and interaction effect on the judgement of truth. According to the pre-analysis plan that we registered, first, a linear regression will be performed on data sets my_data_gender_T and my_data_age_T, which involves testing the main effect of valence on the judgments of truth. Then a two way ANOVA will be carried out to test the interaction effect between group membership and valence. Further, two planned contrasts of the interaction will be tested.

Main effect and interaction effect on the judgement of social acceptability. Accordingly, a linear regression on data sets my_data_gender_A and my_data_age_A involves testing the main effect of valence on the judgments of acceptability. Then, a two way ANOVA will be carried out to test the interaction effect between group membership and valence. Further 2 planned contrasts of the interaction will be tested.

Exploratory analysis. In the exploratory analysis, the regression analysis will be performed on related subdatasets. The analysis involves testing the main effect of group

membership and the interaction effect between group membership and valence on the perceived familiarity, stereotypicality and positivity. Further, a linear regression will be carried out to test if consistency and format of the claims affect how group membership and valence affect various dependent variables.

Preregisterd analyses

Results of Judgments of truth

Analyses for Experiment 1a (Gender-related claims). A significant main effect of valence (positive, negative) on the judgments of truth ($t[256] = 3.90$, $p = .000$) was found, with positively valenced claims ($M = 4.17$, $SD = 0.89$) receiving significantly higher scores on truth than negative claims ($M = 4.00$, $SD = 0.87$).

Additionally a marginally significant interaction was found between valence and group membership (ingroup, outgroup) on the judgments of truth ($F[1, 256] = 7.47$, $p = .007$).

Planned contrasts showed that subjects believed positively valenced claims was significantly truer than negative valenced ones when the claims are targeted at their ingroup ($t[511.61] = 4.72$, $p = .000$), but there was no difference between valences when the claims are targeted at their outgroup ($t[511.61] = 0.80$, $p = .424$). Moreover, no differences were found between ingroupers and outgroupers on the the judgement of truth in the positive condition ($t[486.33] = 2.53$, $p = .012$), and negative condition ($t[486.33] = -1.75$, $p = .081$).

Analyses for Experiment 1b (Age-related claims). A significant main effect of valence (positive, negative) on the judgments of truth ($t[251] = 6.51$, $p = .000$) was found, with positively valenced claims ($M = 4.12$, $SD = 1.12$) receiving significantly higher scores on truth than negatively valenced ones ($M = 3.92$, $SD = 1.01$).

No significant interaction was found between valence and group membership (ingroup, outgroup, middle-aged) on the judgments of truth ($F[1, 143] = 5.86$, $p = .017$).

Planned contrasts showed that there are no significant difference in truth between ingroupers and outgroupers, both in positive condition ($t[264.78] = 0.82$, $p = .416$) and negative condition ($t[264.78] = -3.06$, $p = .002$). Moreover, compared to negative ones, subjects perceive positive claims as significantly truer, both when they are targeted at their ingroup ($t[362.63] = 5.71$, $p = .000$) and outgroup ($t[362.63] = 2.28$, $p = .023$).

Results of Judgments of acceptability

Analyses for Experiment 1a (Gender-related claims). A significant main effect of valence (positive, negative) on the judgments of acceptability ($t[256] = 8.89$, $p = .000$) was found, with positively valenced claims ($M = 4.46$, $SD = 1.23$) receiving significantly higher scores on acceptability than negatively valenced claims ($M = 3.90$, $SD = 1.13$).

Additionally a marginally significant interaction was found between valence and group membership (ingroup, outgroup) on the judgments of acceptability ($F[1, 256] = 9.59$, $p = .002$).

Planned contrasts showed that when the claims are negative, subjects believe the outgroup-targeted claims are marginally significantly more acceptable than ingroup-targeted ones ($t[495.55] = -3.29$, $p = .001$). However, when the content of claims is positive, there is no significant difference in the acceptability between ingroupers and outgroupers ($t[495.55] = 1.47$, $p = .143$).

Analyses for Experiment 1b (Age-related claims). A significant main effect of valence (positive, negative) on the judgments of acceptability ($t[251] = 10.98$, $p = .000$) was found, with positively valenced claims ($M = 4.58$, $SD = 1.27$) receiving significantly higher score on acceptability than negatively valenced ones ($M = 3.86$, $SD = 1.14$).

Additionally no significant interaction was found between valence and group membership (ingroup, outgroup) on the judgments of acceptability ($F[1, 143] = 3.28$, $p =$

.072).

Planned contrasts showed that there are no significant difference in acceptability between ingroupers and outgroupers, both in positive condition ($t[278.45] = 1.49$, $p = .138$) and negative condition ($t[278.45] = -1.28$, $p = .202$).

Results of exploratory analysis

Judgments of truth

Analyses for Experiment 1a (Gender-related claims). The three-way interaction between consistency (stereotypical, counter-stereotypical), valence and group membership is not significant ($F[1, 255] = 0.76$, $p = .383$).

ster: interaction: ($F[1, 132] = 5.48$, $p = .021$) counter: interaction: ($F[1, 123] = 2.07$, $p = .153$)

ster: valence: ($F[1, 132] = 2.47$, $p = .118$) counter: valence: ($F[1, 123] = 20.00$, $p = .000$)

im: interaction: ($F[1, 124] = 2.55$, $p = .113$) ex: interaction: ($F[1, 131] = 4.90$, $p = .029$)

im: valence: ($F[1, 124] = 59.03$, $p = .000$) ex: valence: ($F[1, 131] = 7.31$, $p = .008$)

When the claims are stereotypical, there is no significant main effect of valence on the judgments of truth ($F[1, 0.02] = 2.47$, $p = .118$). However, when presented claims are counter-stereotypical, there is a significant main effect of valence ($F[1, 0.15] = 20.00$, $p = .000$).

Additionally, when the claims are stereotypical, the interaction effect between valence and membership is marginally significant ($F[1, 132] = 5.48$, $p = .021$). However, when presented claims are counter-stereotypical, the interaction effect is not significant ($F[1, 123] = 2.07$, $p = .153$).

The three-way interaction between format (implicit, explicit), valence and group membership is not significant ($F[1, 255] = 0.51, p = .476$).

When the claims are implicit, there is a significant main effect of valence on the judgments of truth ($t[0.11] = 59.03, p = .000$). However, when presented claims are explicit, there is no significant effect of valence ($t[0.03] = 7.31, p = .008$).

ex: interaction: ($F[1, 131] = 4.90, p = .029$). im: interaction: ($F[1, 124] = 2.55, p = .113$).

im: valence: ($F[1, 0.11] = 59.03, p = .000$). ex: valence: ($F[1, 0.03] = 7.31, p = .008$).

Analyses for Experiment 1b (Age-related claims). The three-way interaction between consistency (stereotypical, counter-stereotypical), valence and group membership is not significant ($F[1, 142] = , p = .168$).

ster: interaction: ($F[1, 80] = 0.77, p = .384$) counter: interaction: ($F[1, 62] = 7.69, p = .007$)

ster: valence: ($F[1, 132] = 119.06, p = .000$) counter: valence: ($F[1, 116] = 5.37, p = .022$)

When the claims are stereotypical, there is a significant main effect of valence ($t[0.38] = 119.06, p = .000$) and a marginally significant main effect of membership on the judgments of truth ($t[0.38] = , p = .$).

When presented claims are counter-stereotypical, there is also a significant main effect of valence ($t[0.01] = 5.37, p = .022$), but no significant effect of membership ($t[0.01] = , p = .$).

The three-way interaction between format (implicit, explicit), valence and group membership is not significant ($F[1, 142] = 1.71, p = .193$).

There is a significant main effect of valence on the judgments of truth both in implicit condition ($t[0.36] = 56.53, p = .000$), and explicit condition ($t[0.02] = 22.06, p = .000$).

Judgments of acceptability

Analyses for Experiment 1a (Gender-related claims). The three-way interaction between consistency (stereotypical, counter-stereotypical), valence and group membership is not significant ($F[1, 255] = 0.02, p = .901$).

There is a significant main effect of valence on the judgments of acceptability both in stereotypical condition ($t[132] = 46.35, p = .000$), and counter stereotypical condition ($t[1] = 32.79, p = .000$).

ster: interaction: ($F[1, 132] = 3.86, p = .052$) counter: interaction: ($F[1, 123] = 6.23, p = .014$)

The three-way interaction between format (implicit, explicit), valence and group membership is not significant ($F[1, 255] = 0.92, p = .338$).

There is a significant main effect of valence on the judgments of acceptability in implicit condition ($t[1] = 118.45, p = .000$), but not in explicit condition ($t[1] = 1.51, p = .221$). Additionally, there appears marginally significant interaction effect between valence and membership only in explicit condition

im:interaction: ($t[1] = 1.84, p = .177$).

ex: interaction: ($t[1] = 10.01, p = .002$).

Analyses for Experiment 1b (Age-related claims). The three-way interaction between consistency (stereotypical, counter-stereotypical), valence and group membership is not significant ($F[1, 142] = , p = .176$). ster: interaction: ($F[1, 80] = 0.23, p = .635$) counter: interaction: ($F[1, 62] = 4.62, p = .035$)

ster: valence: ($F[1, 132] = 158.69, p = .000$) counter: valence: ($F[1, 116] = 23.71, p = .000$)

ster:membership: ($F[1, NA] = 4.24, p = .042$) counter: membership: ($F[1, NA] = 4.23, p = .042$)

There is a significant main effect of valence on the judgments of acceptability both in stereotypical condition , and counter stereotypical condition.

The three-way interaction between format (implicit, explicit), valence and group membership is not significant ($F[1, 142] = 0.25, p = .614$).

im: interaction: ($F[1, 67] = 1.06, p = .306$) ex: interaction: ($F[1, 75] = 2.20, p = .142$)

im: valence: ($F[1, 123] = 116.41, p = .000$) ex: valence: ($F[1, 125] = 40.75, p = .000$)

im:membership: ($F[1, NA] = 0.57, p = .454$) ex: membership: ($F[1, NA] = 4.25, p = .041$)

There is a significant main effect of valence on the judgments of acceptability both in implicit condition , and explicit condition .

Judgments of familiarity

Analyses for Experiment 1a (Gender-related claims). There is no significant main effect of membership (ingroup, outgroup) on the judgments of familiarity ($t[255] = -0.48, p = .632$), with outgroup-targeted claims ($M = 4.12, SD = 1.27$) receiving slightly higher scores on familiarity than those targeted at ingroup ($M = 4.09, SD = 1.26$)

Additionally there no significant interaction was found between valence (positive, negative) and group membership on the judgments of familiarity ($F[1, 256] = 0.86, p = .354$).

The three-way interaction between consistency (stereotypical, counter-stereotypical), valence and group membership is also not significant ($F[1, 255] = , p = .569$). There is a marginally significant main effect of consistency on the judgement of familiarity ($F[, 255] = , p = .$).

The three-way interaction between format (implicit, explicit), valence and group membership is also not significant ($F[1, 255] = 0.27, p = .601$). There is a marginally

significant main effect of format on the judgement of familiarity ($F[1, 255] = , p =$).

im: interaction: ($F[1, 124] = 0.08, p = .776$) ex: interaction: ($F[1, 131] = 0.97, p = .327$)

im: valence: ($F[1, 124] = 1.66, p = .200$) ex: valence: ($F[1, 131] = 10.37, p = .002$)

im:membership: ($F[124, NA] = NA, p = NA$) ex: membership: ($F[131, NA] = NA, p = NA$)

Analyses for Experiment 1b (Age-related claims). There is no significant main effect of membership (ingroup, outgroup) on the judgments of familiarity ($t[143] = 0.08, p = .935$), with outgroup-targeted claims ($M = 4.15, SD = 1.41$) receiving slightly higher scores on familiarity than those targeted at ingroup ($M = 4.12, SD = 1.48$)

Additionally there no significant interaction was found between valence (positive, negative) and group membership on the judgments of familiarity ($F[1,] = 2.66, p =$).

A significant three-way interaction between consistency (stereotypical, counter-stereotypical), valence and group membership ($F[1, 142] = , p = .001$) was found. There is a significant main effect of consistency on the judgement of familiarity ($F[, 142] = , p =$).

The three-way interaction between format (implicit, explicit), valence and group membership is not significant ($F[1, 142] = 0.00, p = .998$). There is a significant main effect of format on the judgement of familiarity ($F[, 142] = , p =$).

ster: interaction: ($F[1, 80] = 1.15, p = .287$) counter: interaction: ($F[1, 62] = 12.88, p = .001$)

ster: valence: ($F[1, 132] = 4.82, p = .030$) counter: valence: ($F[1, 116] = 0.07, p = .787$)

ster:membership: ($F[1, NA] = 2.48, p = .118$) counter: membership: ($F[1, NA] = 0.35, p = .555$)

Judgments of stereotypicality

Analyses for Experiment 1a (Gender-related claims). There was no significant main effect of membership (ingroup, outgroup) on the judgments of stereotypicality ($t[255] = -0.19$, $p = .849$), with ingroup-targeted claims ($M = 4.41$, $SD = 1.48$) receiving slightly higher scores on stereotypicality than those targeted at outgroup ($M = 4.29$, $SD = 1.47$).

Additionally no significant interaction was found between valence (positive, negative) and group membership on the judgments of stereotypicality ($F[1, 256] = 0.14$, $p = .711$).

The three-way interaction between consistency (stereotypical, counter-stereotypical), valence and group membership is also not significant ($F[1, 255] =$, $p = .702$). The three-way interaction between format (implicit, explicit), valence and group membership is also not significant ($F[1, 255] = 0.27$, $p = .601$).

IM: interaction: ($F[1, 124] = 0.17$, $p = .679$) EX: interaction: ($F[1, 131] = 0.01$, $p = .918$)

IM: valence: ($F[1, 124] = 3.89$, $p = .051$) EX: valence: ($F[1, 131] = 11.95$, $p = .001$)

IM: membership: ($F[1, 124] = 3.89$, $p = .048$) EX: membership: ($F[1, 131] = 11.95$, $p = .722$)

ster: interaction: ($F[1, 132] = 0.37$, $p = .547$) counter: interaction: ($F[1, 123] = 0.00$, $p = .987$)

ster: valence: ($F[1, 132] = 2.91$, $p = .091$) counter: valence: ($F[1, 123] = 9.97$, $p = .002$)

ster: membership: ($F[1, 132] = 2.91$, $p = .091$) counter: membership: ($F[1, 123] = 9.97$, $p = .002$)

Analyses for Experiment 1b (Age-related claims). There was no significant main effect of membership (ingroup, outgroup) on the judgments of stereotypicality ($t[143]$

$= 0.78$, $p = .439$), with ingroup-targeted claims ($M = 4.41$, $SD = 1.48$) receiving slightly higher scores on stereotypicality than those targeted at outgroup ($M = 4.29$, $SD = 1.47$).

Additionally no significant interaction was found between valence (positive, negative) and group membership on the judgments of stereotypicality ($F[1,] = 0.37$, $p = .$).

There is a significant three-way interaction between consistency (stereotypical, counter-stereotypical), valence and group membership ($F[1, 142] = , p = .001$).

Additionally, when presented claims are stereotypical, the interaction effect is marginally significant. However, when the claims are counter stereotypical, the interaction effect between valence and membership is not significant

The three-way interaction between format (implicit, explicit), valence and group membership is not significant ($F[1, 142] = 0.02$, $p = .888$).

ster: interaction: ($F[1, 80] = 2.74$, $p = .102$) counter: interaction: ($F[1, 62] = 8.96$, $p = .004$)

ster: valence: ($F[1, 132] = 3.05$, $p = .083$) counter: valence: ($F[1, 116] = 0.16$, $p = .694$)

ster:membership: ($F[1, 80] = 3.05$, $p = .846$) counter: membership: ($F[1, 62] = 0.16$, $p = .259$)

im: interaction: ($F[1, 67] = 0.10$, $p = .755$) ex: interaction: ($F[1, 75] = 0.29$, $p = .590$)

im: valence: ($F[1, 123] = 1.63$, $p = .204$) ex: valence: ($F[1, 125] = 0.53$, $p = .468$)

im:membership: ($F[1, 67] = 1.63$, $p = .694$) ex: membership: ($F[1, 75] = 0.53$, $p = .137$)

Judgments of positivity

Analyses for Experiment 1a (Gender-related claims). There was no significant main effect of membership (ingroup, outgroup) on the judgments of positivity

($t[256] = -1.58$, $p = .116$), with outgroup-targeted claims ($M = 3.81$, $SD = 0.81$) receiving slightly higher scores on positivity than those targeted at ingroup ($M = 3.75$, $SD = 0.80$)

Additionally there is a significant interaction was found between valence (positive, negative) and group membership on the judgments of positivity ($F[1, 256] = 13.93$, $p = .000$).

Post-hoc comparisons showed subjects believed that positively valenced claims were significantly more positive than negatively valenced ones both when they are targeted at ingroup ($t[350.27] = 16.95$, $p = .000$) and outgroup ($t[350.27] = 13.96$, $p = .000$). Moreover, when the claims are negative, outgroupers rated significantly higher on positivity compared to ingroupers ($t[508.23] = -3.82$, $p = .000$). Yet, no significant differences were found between ingroupers and outgroupers on the judgment of positivity when the content of claims are positive ($t[508.23] = 1.68$, $p = .094$).

The three-way interaction between consistency (stereotypical, counter-stereotypical), valence and group membership is not significant ($F[1, 255] =$, $p = .941$).

There is a significant main effect of valence on the judgments of positivity both in stereotypical condition , and counter stereotypical condition .

The three-way interaction between format (implicit, explicit), valence and group membership is also not significant ($F[1, 255] = 0.24$, $p = .625$).

There is a significant main effect of valence on the judgments of positivity both in implicit condition , and explicit condition .

Additionally, when the claims are explicit, the interaction effect between valence and membership is marginally significant . However, when presented claims are implicit, the interaction effect is not significant .

ster: interaction: ($F[1, 132] = 6.18$, $p = .014$) counter: interaction: ($F[1, 123] = 8.25$, $p = .005$)

ster: valence: ($F[1, 132] = 156.97, p = .000$) counter: valence: ($F[1, 123] = 127.17, p = .000$)

ster: membership: ($F[1, 132] = 0.95, p = .331$) counter: membership: ($F[1, 123] = 1.57, p = .213$)

im: interaction: ($F[1, 124] = 5.34, p = .022$) ex: interaction: ($F[1, 131] = 8.63, p = .004$)

im: valence: ($F[1, 124] = 290.65, p = .000$) ex: valence: ($F[1, 131] = 80.18, p = .000$)

Analyses for Experiment 1b (Age-related claims). There is no significant main effect of membership (ingroup, outgroup) on the judgments of positivity ($t[143] = 0.22, p = .825$), with ingroup-targeted claims ($M = 3.74, SD = 0.86$) receiving slightly higher scores on positivity than those targeted at outgroup ($M = 3.73, SD = 0.77$).

Additionally no significant interaction was found between valence (positive, negative) and group membership on the judgments of positivity .

Post-hoc comparisons showed subjects believed that positively valenced claims were significantly more positive than negatively valenced ones both when they are targeted at ingroup ($t[314.70] = 14.65, p = .000$) and outgroup ($t[314.70] = 13.50, p = .000$).

The three-way interaction between consistency (stereotypical, counter-stereotypical), valence and group membership is not significant .

There is a significant main effect of valence on the judgments of positivity both in stereotypical condition , and counter stereotypical condition.

The three-way interaction between format (implicit, explicit), valence and group membership is also not significant ($F[1, 142] = 0.31, p = .578$).

There is a significant main effect of valence on the judgments of positivity both in implicit condition , and explicit condition .

ster: interaction: ($F[1, 80] = 1.82, p = .182$) counter: interaction: ($F[1, 62] = 0.90, p = .347$)

ster: valence: ($F[1, 1] = 261.38, p = .000$) counter: valence: ($F[1, 1] = 99.04, p = .000$)

ster:membership: ($F[1, 132] = 261.38, p = .000$) counter: membership: ($F[1, 116] = 99.04, p = .000$)

im: interaction: ($F[1, 67] = 2.84, p = .096$) ex: interaction: ($F[1, 75] = 0.56, p = .458$)

im: valence: ($F[1, 1] = 322.09, p = .000$) ex: valence: ($F[1, 1] = 93.25, p = .000$)

im:membership: ($F[1, 123] = 322.09, p = .000$) ex: membership: ($F[1, 125] = 93.25, p = .000$)

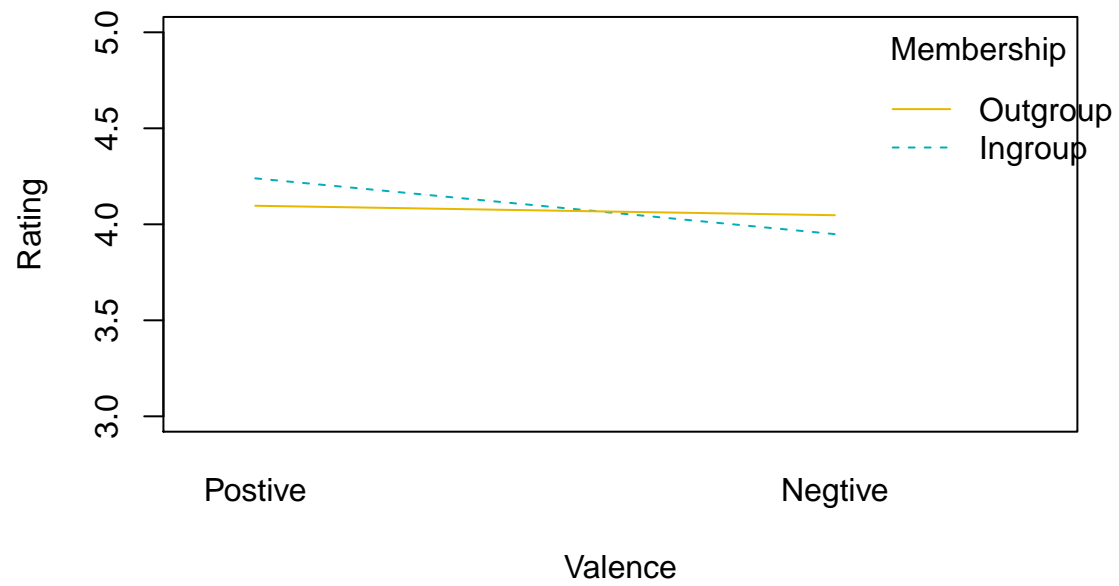


Figure 1. Interaction effect of valence and membership on the truth of gender-related claims.

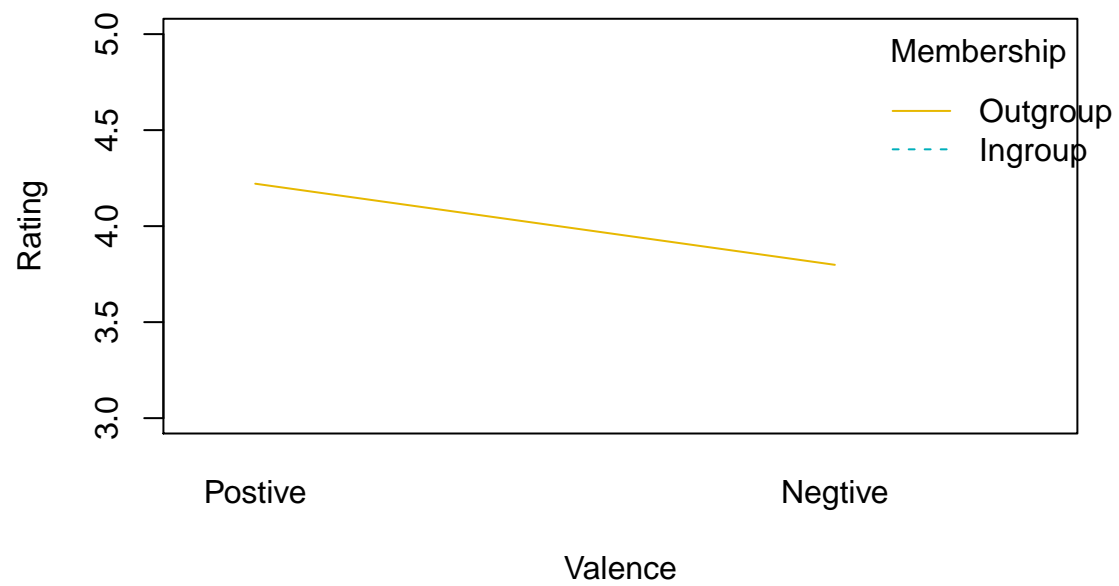


Figure 2. Interaction effect of valence and membership on the truth of age-related claims.

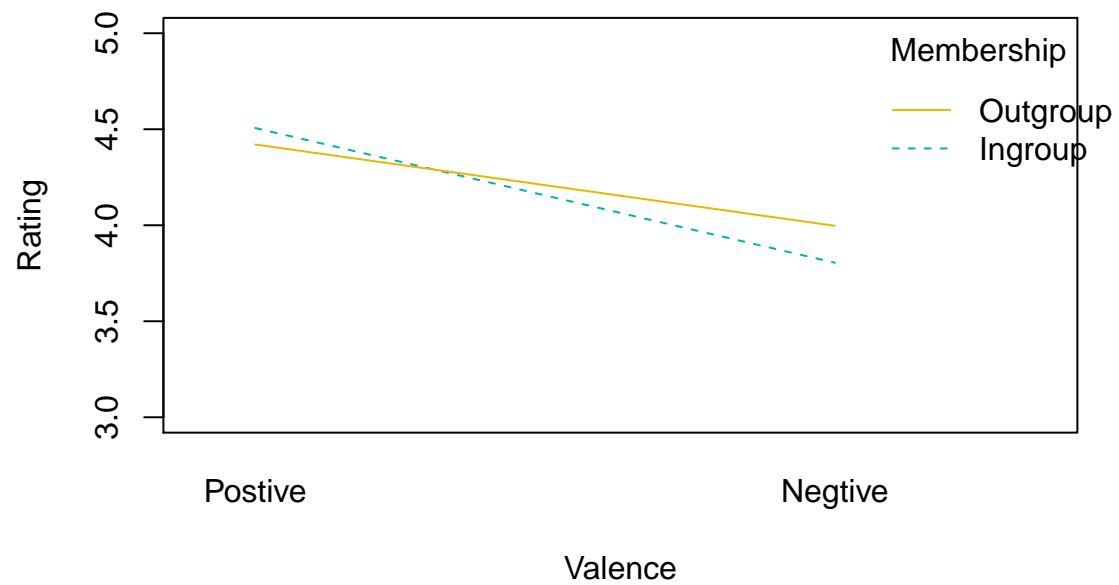


Figure 3. Interaction effect of valence and membership on the acceptability of gender-related claims.

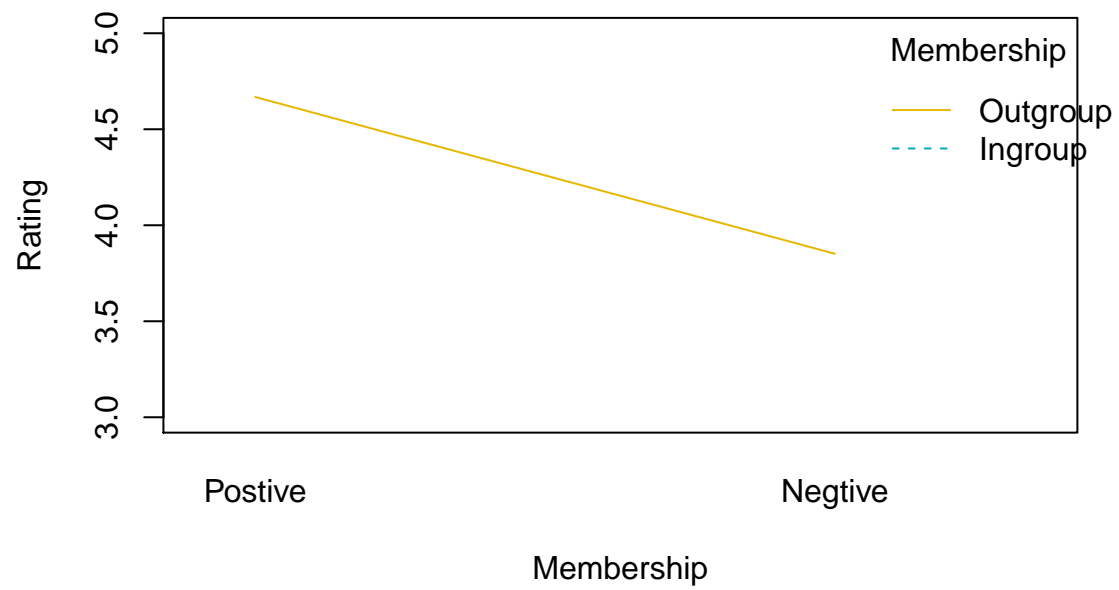


Figure 4. Interaction effect of valence and membership on the acceptability of age-related claims.

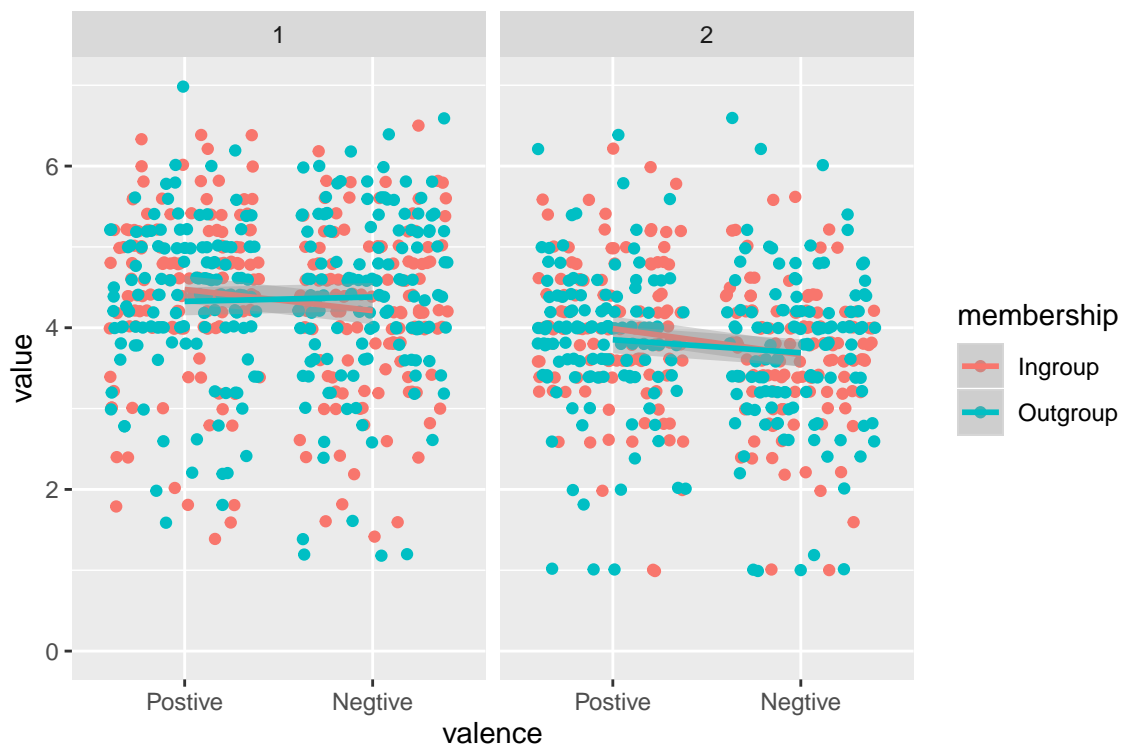


Figure 5. Three way interaction between consistency, valence and membership on the truth of gender-related claims.

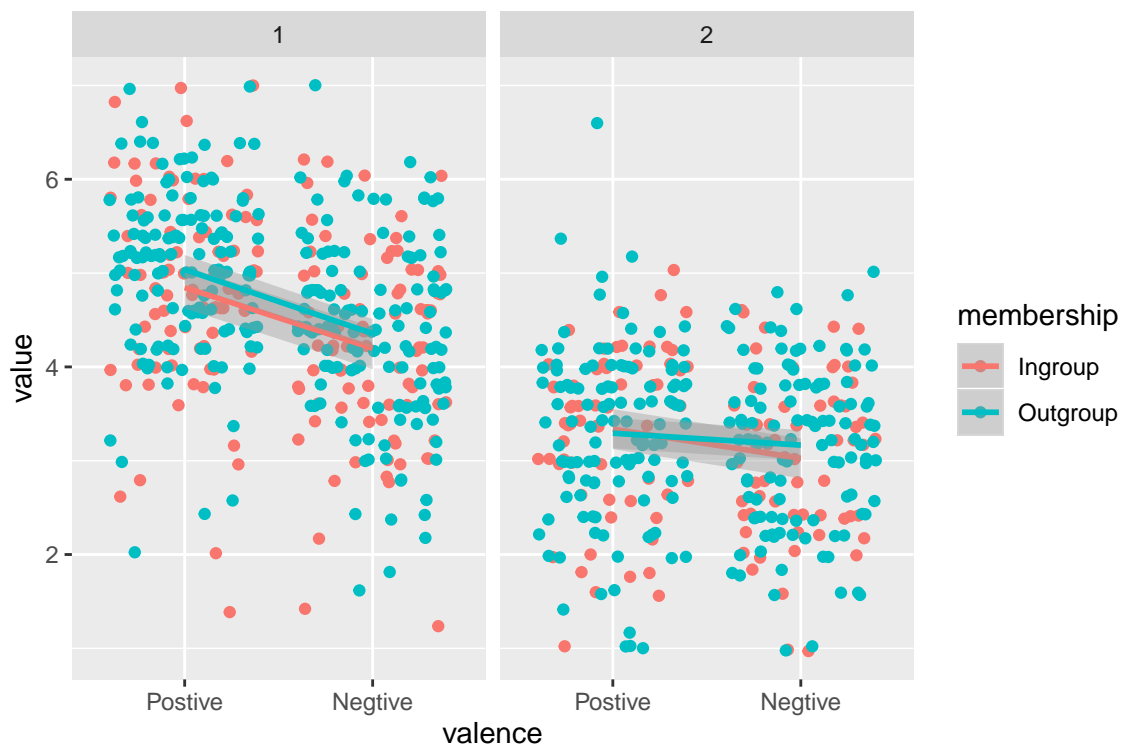


Figure 6. Three way interaction between consistency, valence and membership on the truth of age-related claims.

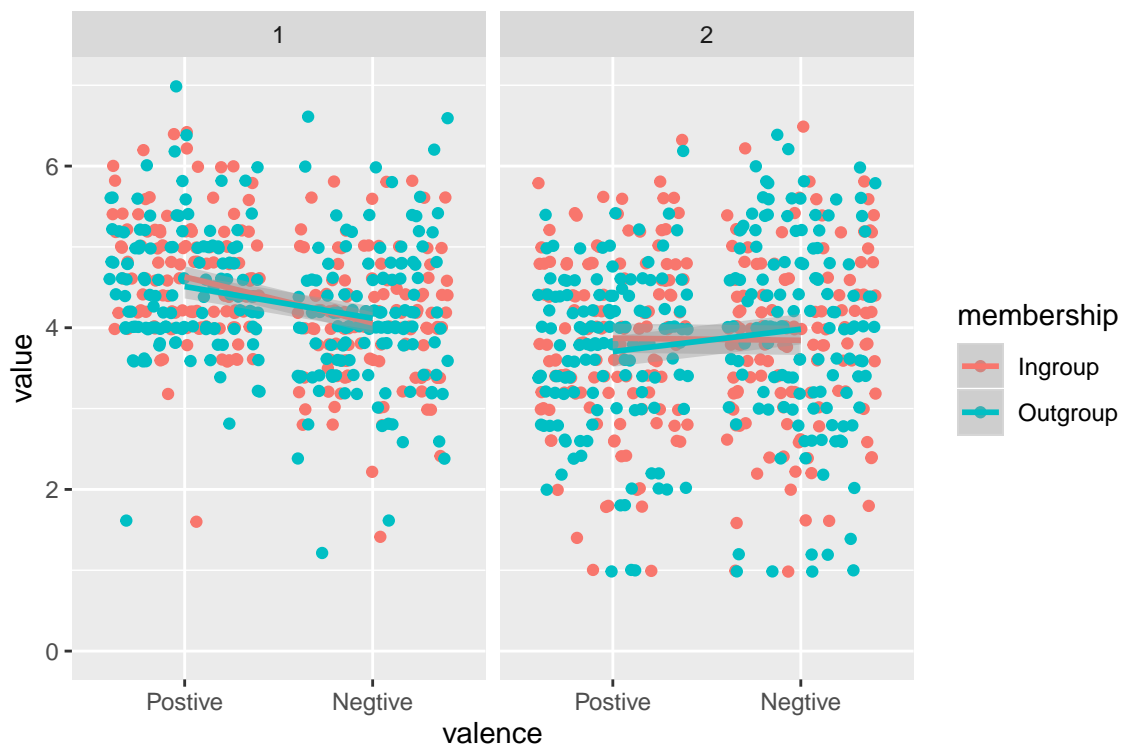


Figure 7. Three way interaction between format, valence and membership on the truth of gender-related claims.

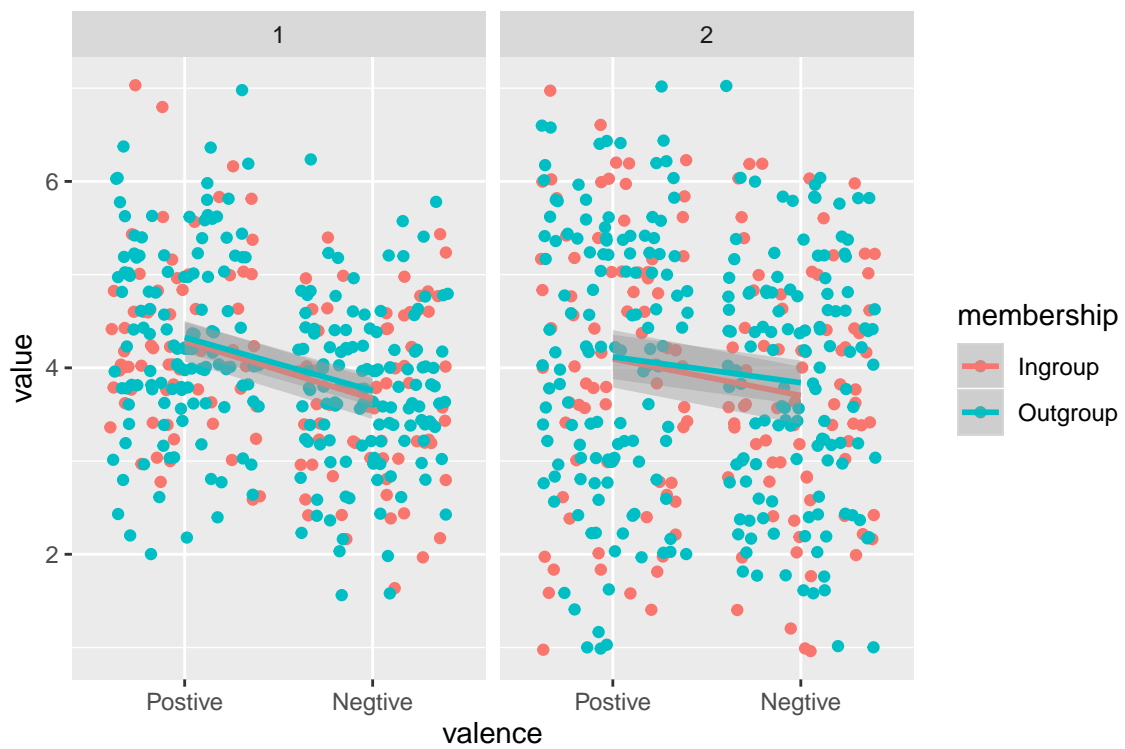


Figure 8. Three way interaction between format, valence and membership on the truth of age-related claims.

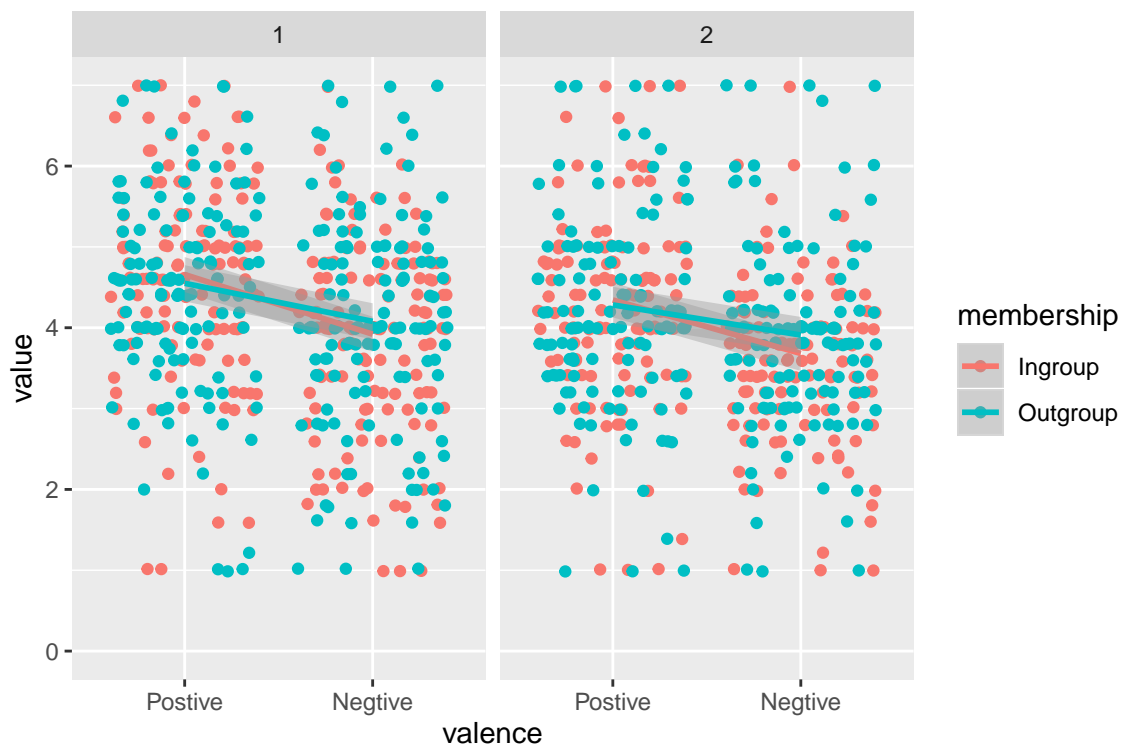


Figure 9. Three way interaction between consistency, valence and membership on the acceptability of gender-related claims.

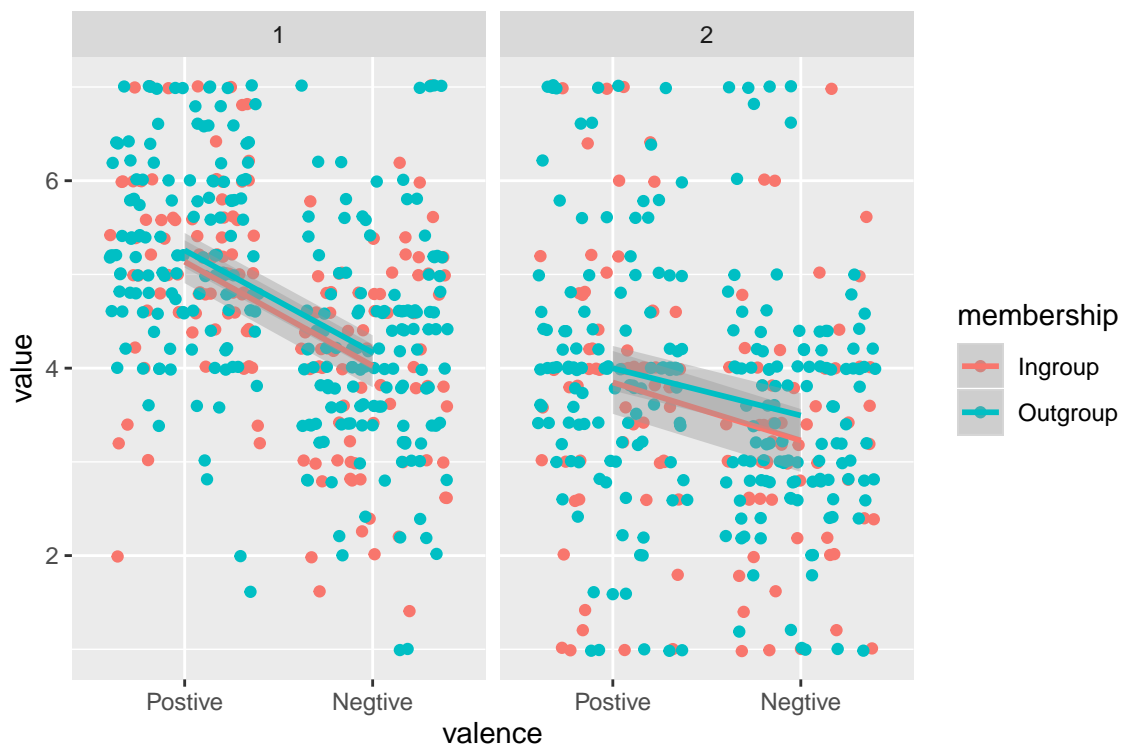


Figure 10. Three way interaction between consistency, valence and membership on the acceptability of age-related claims.

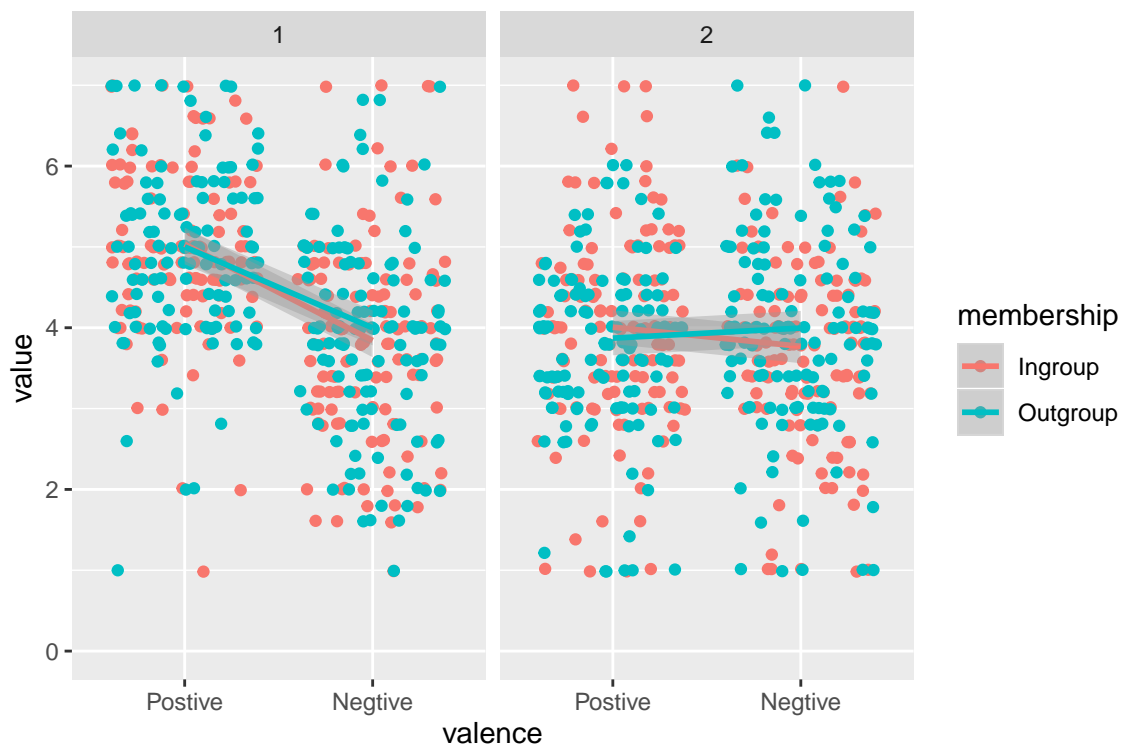


Figure 11. Three way interaction between format, valence and membership on the acceptability of gender-related claims.

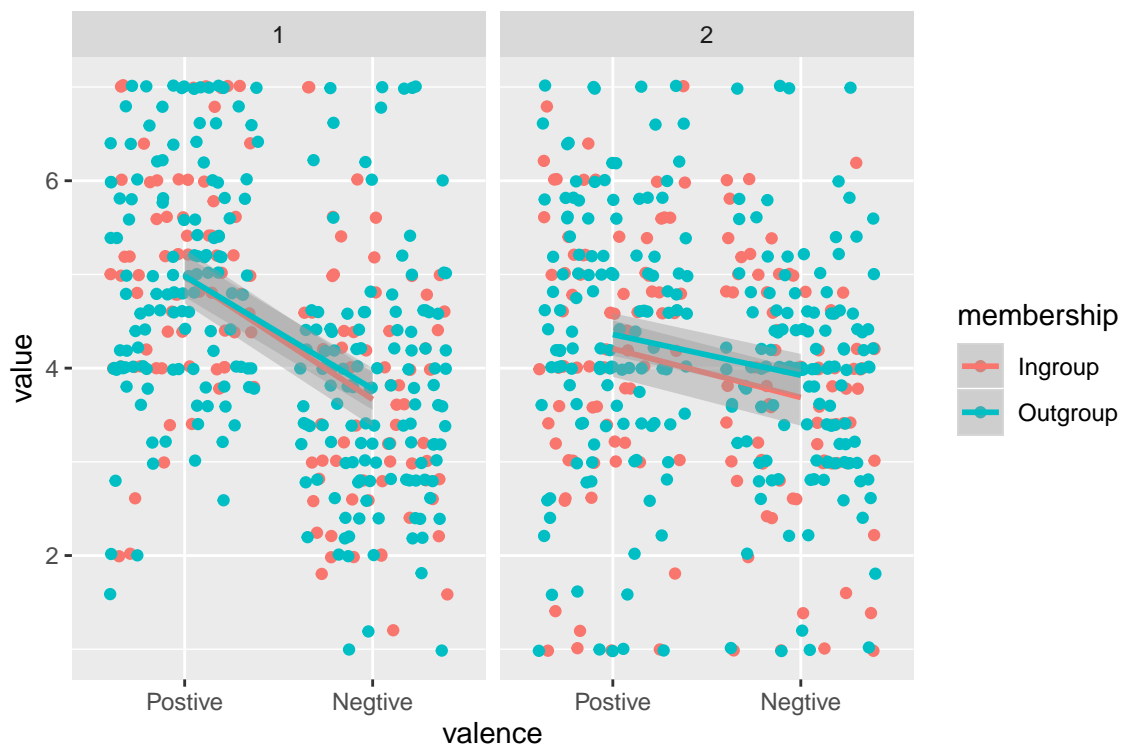


Figure 12. Three way interaction between format, valence and membership on the acceptability of age-related claims.

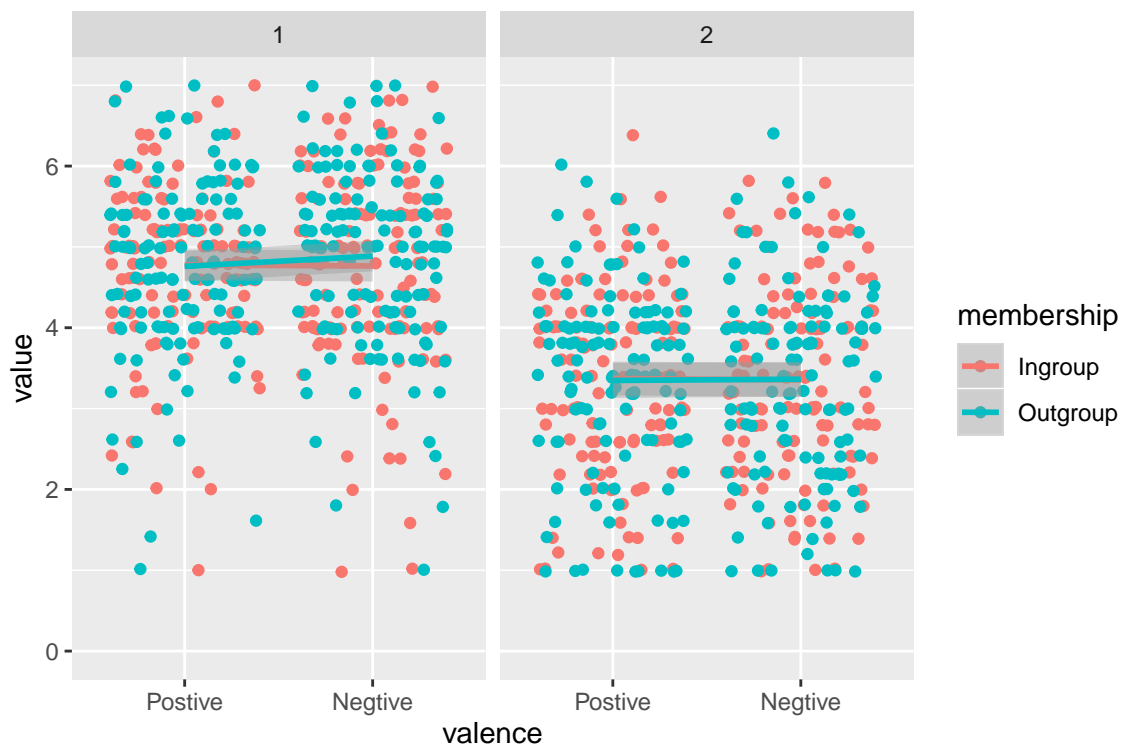


Figure 13. Three way interaction between consistency, valence and membership on the familiarity of gender-related claims.

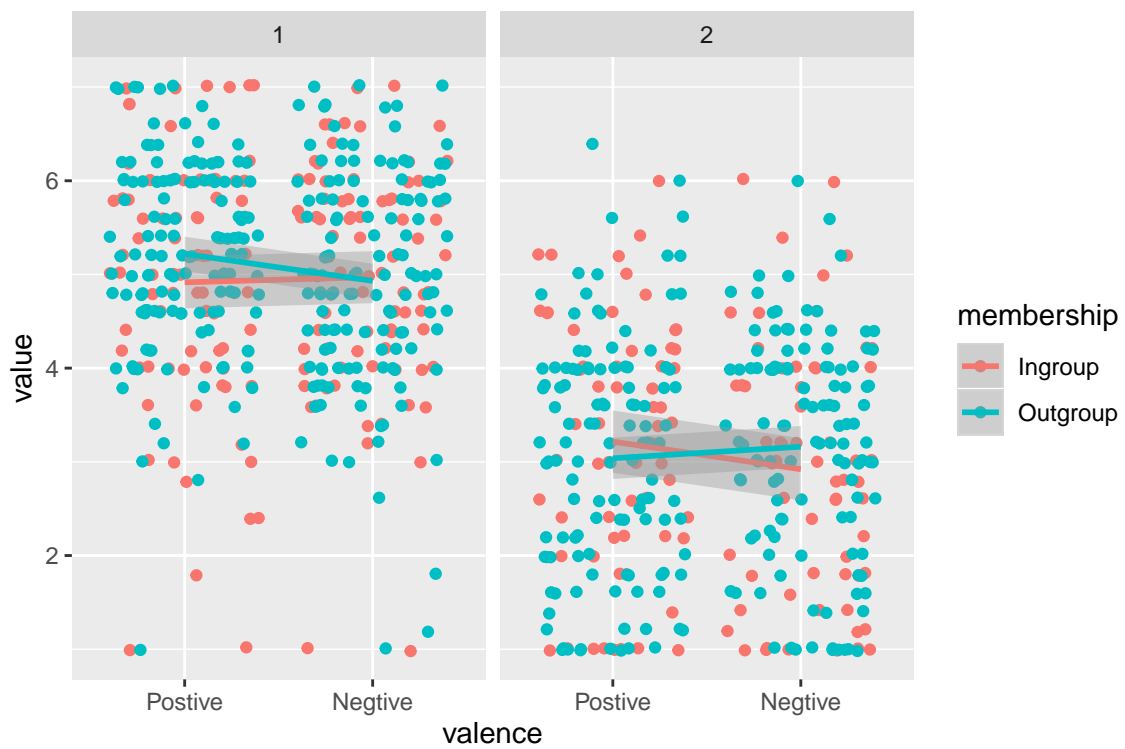


Figure 14. Three way interaction between consistency, valence and membership on the familiarity of age-related claims.

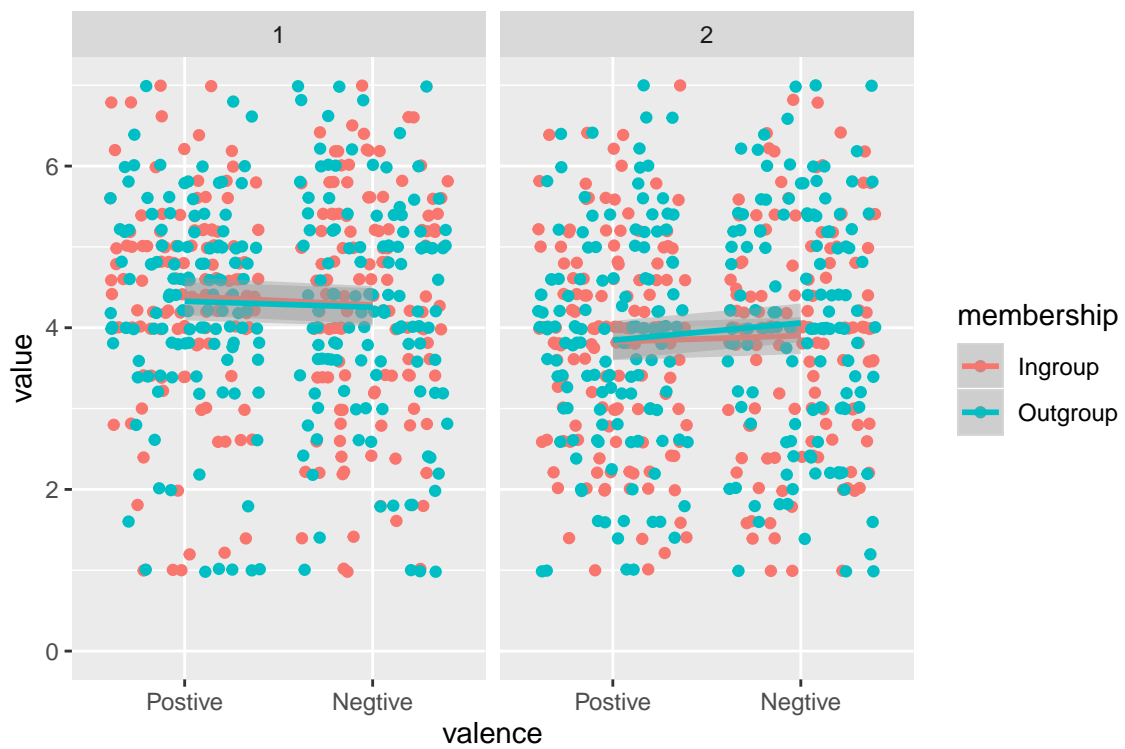


Figure 15. Three way interaction between format, valence and membership on the familiarity of gender-related claims.



Figure 16. Three way interaction between format, valence and membership on the familiarity of age-related claims.

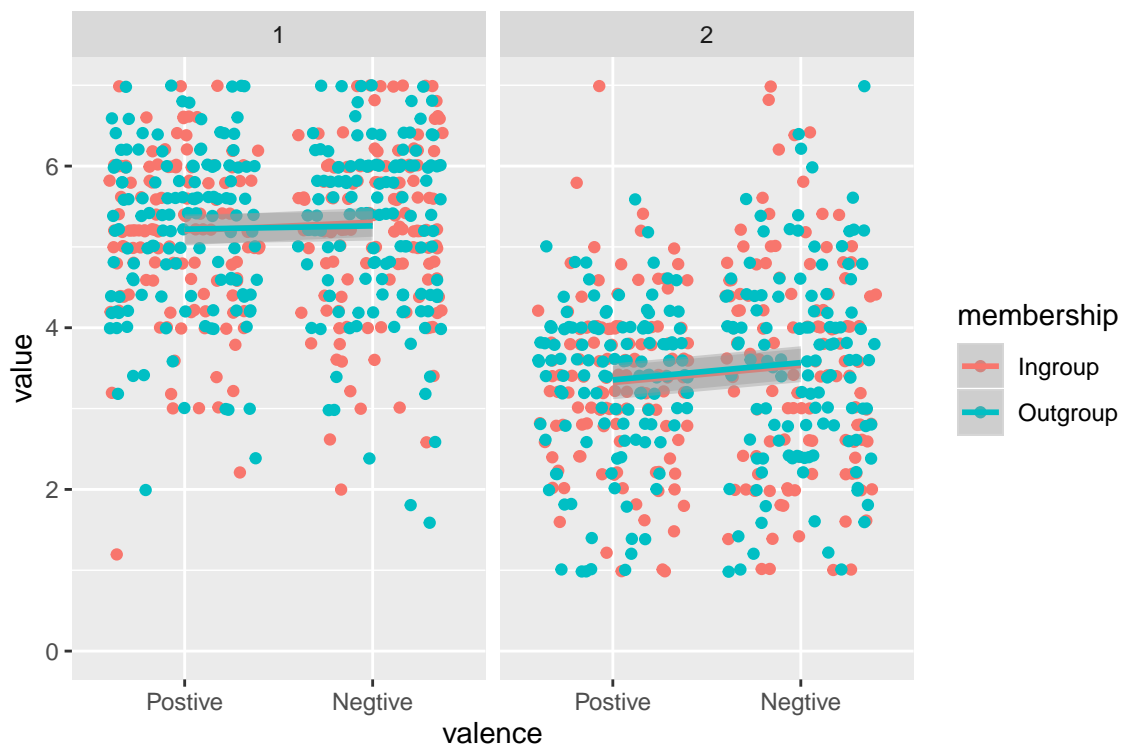


Figure 17. Three way interaction between consistency, valence and membership on the stereotypicality of gender-related claims.

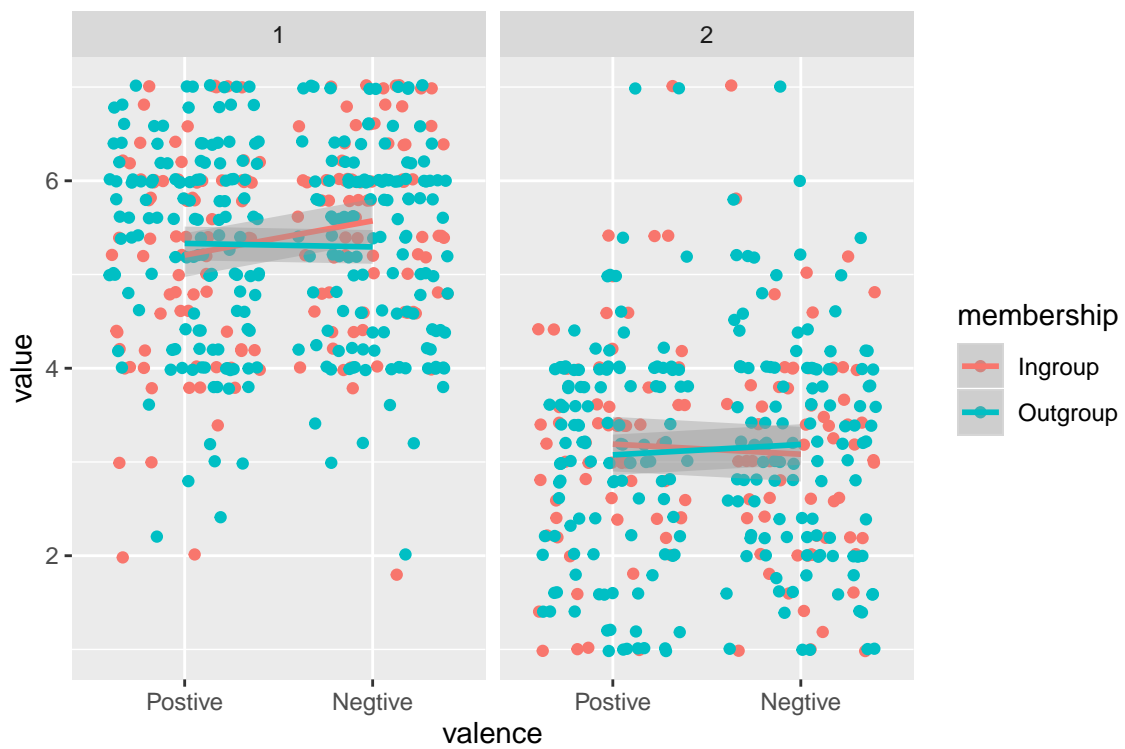


Figure 18. Three way interaction between consistency, valence and membership on the stereotypicality of age-related claims.

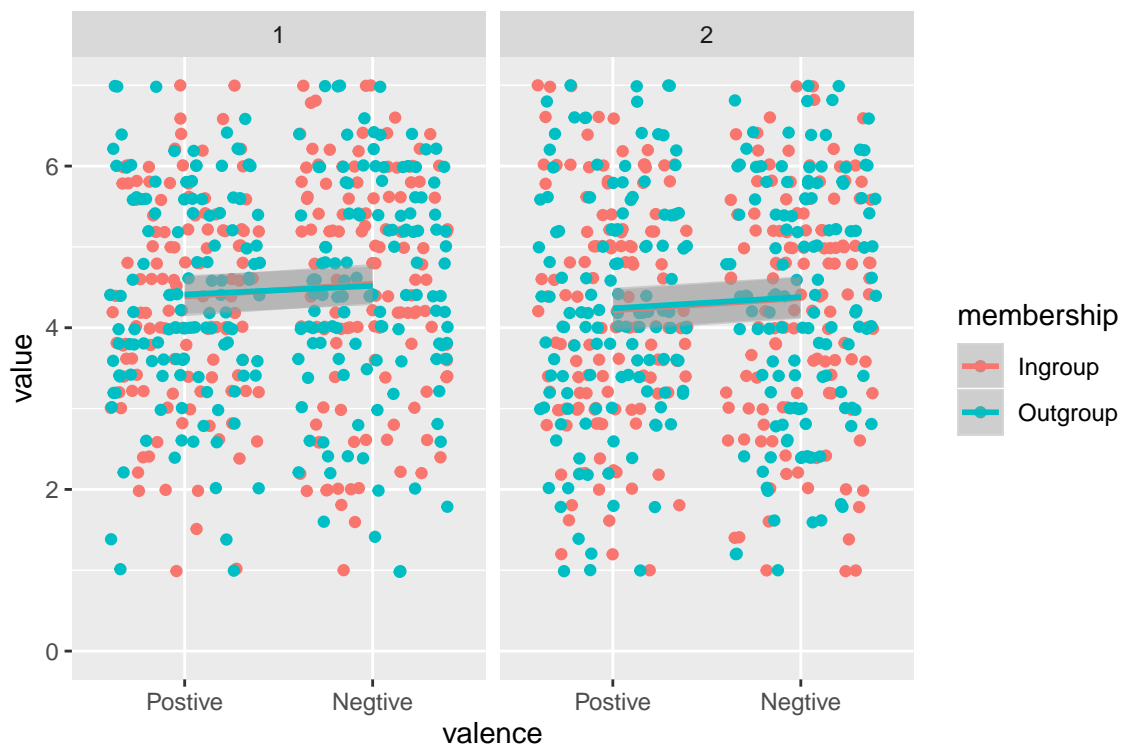


Figure 19. Three way interaction between format, valence and membership on the stereotypicality of gender-related claims.

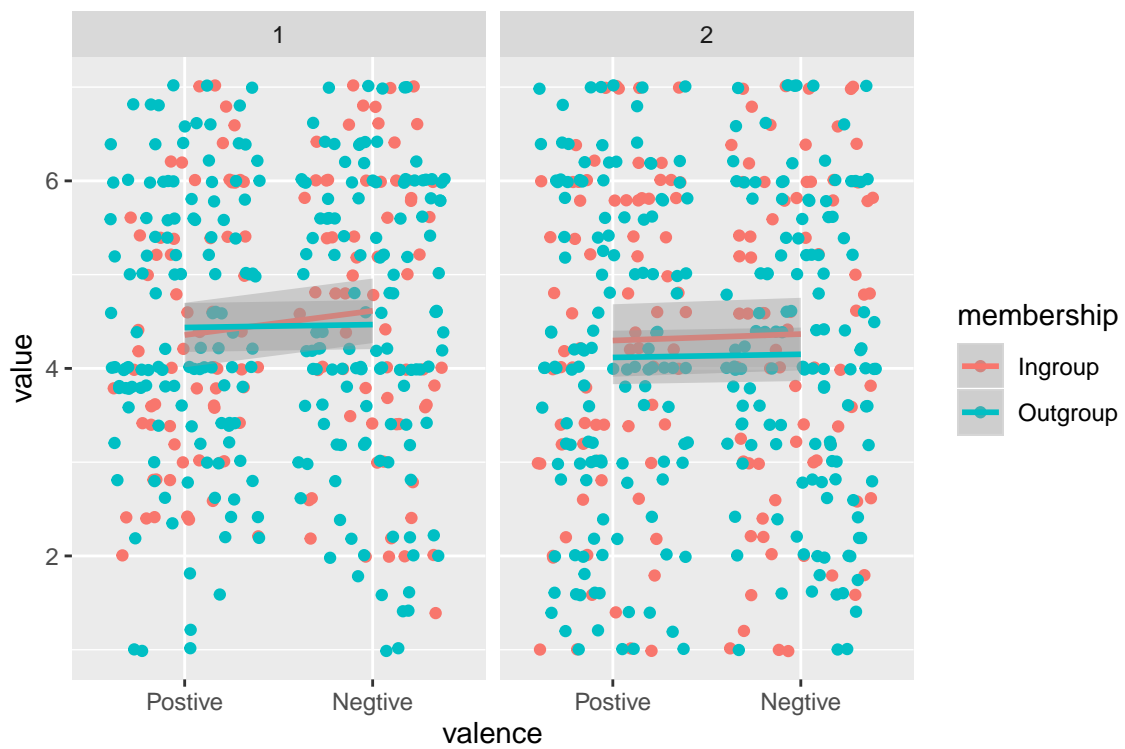


Figure 20. Three way interaction between format, valence and membership on the stereotypicality of age-related claims.

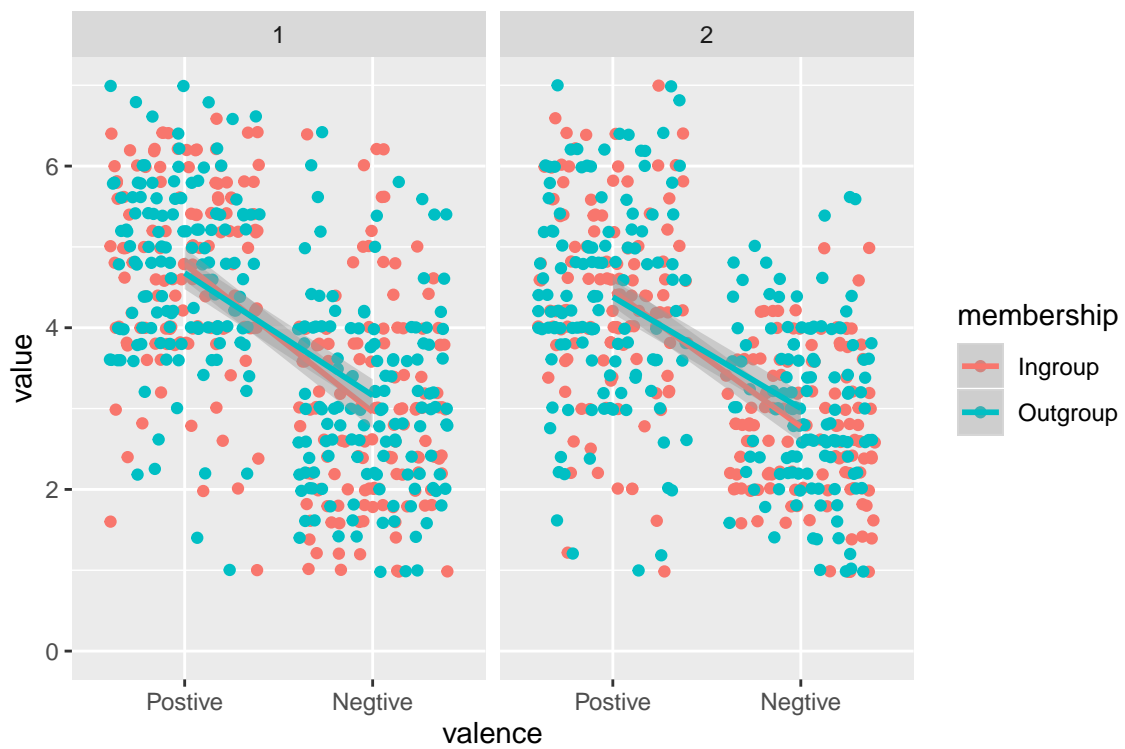


Figure 21. Three way interaction between consistency, valence and membership on the positivity of gender-related claims.

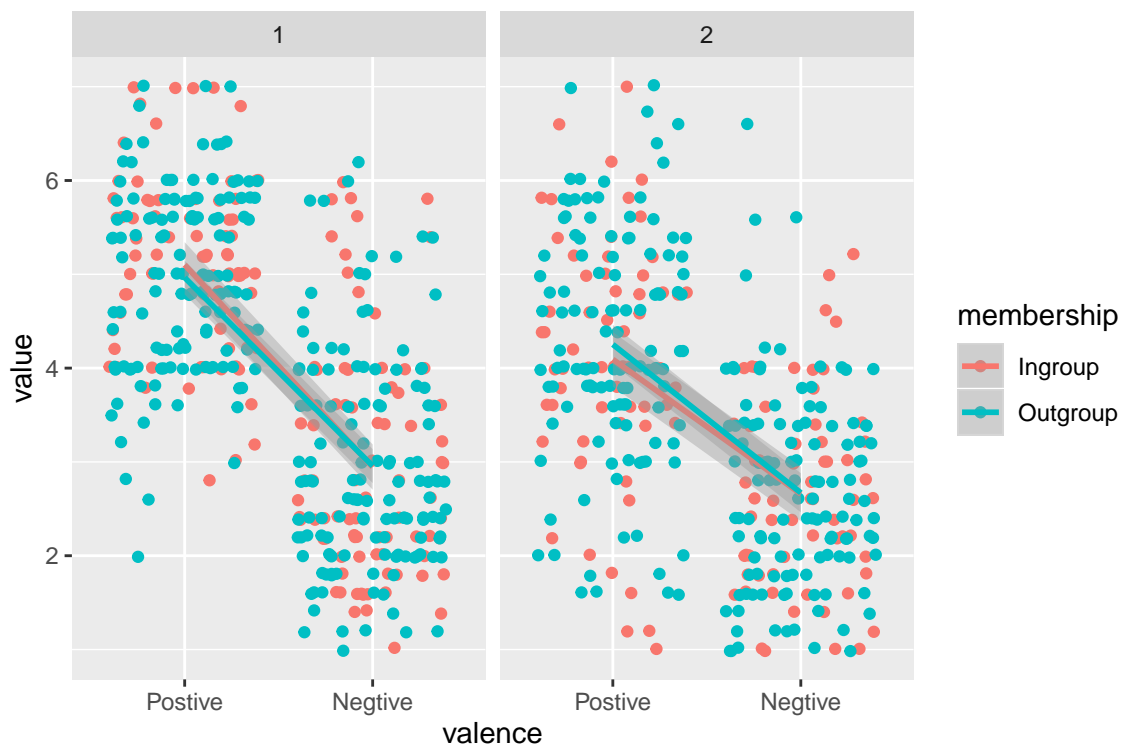


Figure 22. Three way interaction between consistency, valence and membership on the positivity of age-related claims.

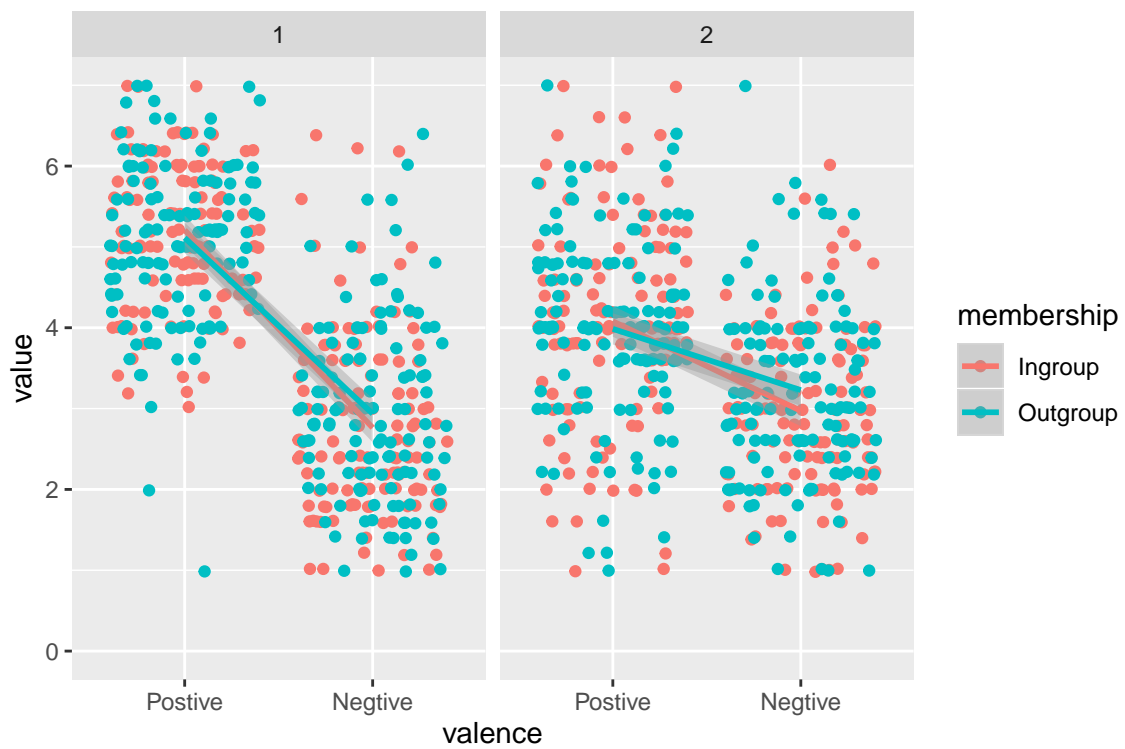


Figure 23. Three way interaction between format, valence and membership on the positivity of gender-related claims.

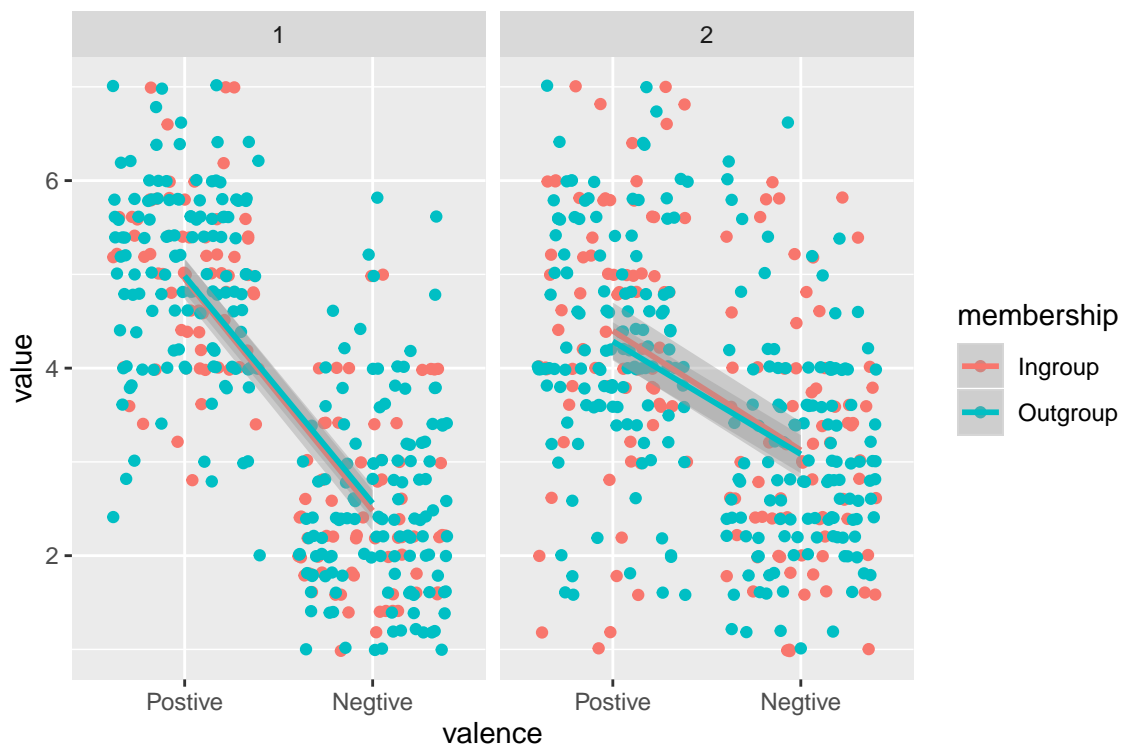


Figure 24. Three way interaction between format, valence and membership on the positivity of age-related claims.