A replication of Tieu et al. (2016)

Masoud Jasbi

Abstract

Two recent studies report children interpreting disjunction words similar to conjunction words. Tieu et al. (2016) Singh et al. (2016) Here we replicate Tieu et al. (2016). The results show that X!

The key statistical test that will be a mixed-effects logistic regression with disjunction type as a fixed effect and with the random effects of subject and items. The DV has the two levels of Right and Wrong.

Introduction

Tieu et al. (2016) investigated children's interpretation of the french simple and complex disjunction words *ou/soit ... soit* as well as the Japanese ones *ka/ka...ka*. Their claims hold for disjunction words crosslinguistically so in this project I investigate English speaking children's interpretation of *or/either ... or*. The authors used a Truth Value Judgement Task (Crain and Thornton 1998) in the form of a guessing game. Videos of a puppet giraffe making predictions about a story were recorded. In each trial, participants saw a picture and heard a story. Then the pre-recorded videos were played: the puppet appeared on the laptop screen and made a guess about what happens next in the story. Then participants saw the rest of the story and had to decide whether the puppet's guess was correct or not by stamping under a happy or sad face on a scorecard.

Experiment

Method

Participants

Table X summarizes the participant information for both the original study and the replication reported here.

	Language	Disjunct	Adult	Child
1	French	Simple	10	14
2	French	Complex	10	14
3	Japanese	Simple	10	11
4	Japanese	Complex	11	7

Table 1: The number of participants and the age ranges.

Procedure

Tieu et al. (2016) used a modified version of the Truth Value Judgement Task (TVJT) in Prediction Mode. TVJTs can be designed in two general modes: Description and Prediction (Crain and Thornton 1998). Both modes involve a short story. In description mode, participants are asked to assess whether a target sentence is a right description for a story. In prediction mode, the target sentence is produced mid-story as a prediction of how the story will unfold. Participants are asked to judge whether the prediction was right.

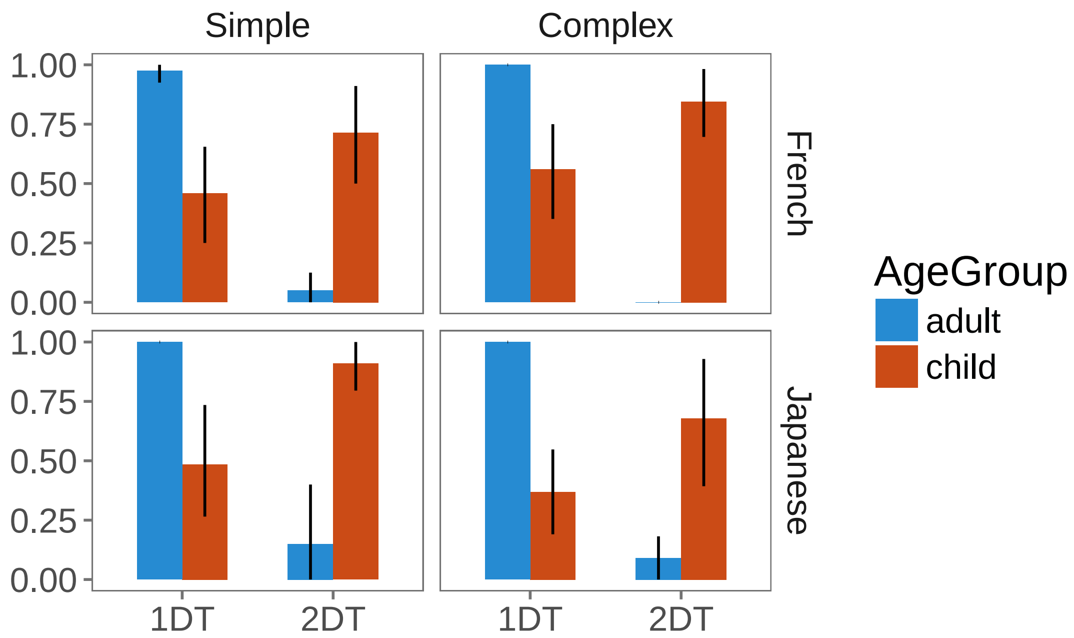

Figure 1: Error bars show 95% confidence intervals.

Materials

Results

Analysis

```
################################ Original code
contrasts(data$Complex)<-contr.sum(2)
data$Condition<-factor(data$Condition)
contrasts(data$Condition)<-contr.sum(2)
contrasts(data$AgeGroup)<-contr.sum(2)
data$Lang <-factor(data$Lang)
contrasts(data$Lang)<-contr.sum(2)

#################
# 1DT comparison
#################

data1DT<-subset(data,Condition=="1DT")

mod1DT<-glmer(response~AgeGroup+Complex*Lang+(1|participant),family=binomial(link="logit"),data= data1D
model1<-glmer(response~AgeGroup+(1|participant) + (1|item.name),family=binomial(link="logit"),data= dat

summary(model1)
```

```
## Generalized linear mixed model fit by maximum likelihood (Laplace
##   Approximation) [glmerMod]
##  Family: binomial  ( logit )
## Formula: response ~ AgeGroup + (1 | participant) + (1 | item.name)
##    Data: data1DT
```

```
##
##      AIC      BIC   logLik deviance df.resid
##    227.3    242.6   -109.6    219.3      338
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -3.9775 -0.3321  0.0343  0.2514  1.5761
##
## Random effects:
##  Groups      Name        Variance Std.Dev.
##  participant (Intercept) 5.192    2.279
##  item.name   (Intercept) 0.000    0.000
## Number of obs: 342, groups:  participant, 87; item.name, 16
##
## Fixed effects:
##             Estimate Std. Error z value Pr(>|z|)
## (Intercept)   3.2887     0.6716   4.897 9.73e-07 ***
## AgeGroup1     3.4297     0.6766   5.069 3.99e-07 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Correlation of Fixed Effects:
##           (Intr)
## AgeGroup1 0.815
```

```
mod1DT0<-glmer(response~1+Complex*Lang+(1|participant),family=binomial(link="logit"),data= data1DT)

anova(mod1DT,mod1DT0)
```

```
## Data: data1DT
## Models:
## mod1DT0: response ~ 1 + Complex * Lang + (1 | participant)
## mod1DT: response ~ AgeGroup + Complex * Lang + (1 | participant)
##         Df    AIC    BIC  logLik deviance  Chisq Chi Df Pr(>Chisq)
## mod1DT0  5 287.82 306.99 -138.91   277.82
## mod1DT   6 229.75 252.76 -108.87   217.75 60.069      1  9.158e-15 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
#################
# 2DT comparison
#################

data2DT<-subset(data,Condition=="2DT")


mod2DT<-glmer(response~AgeGroup+Complex*Lang+(1|participant),family=binomial(link="logit"),data= data2DT
mod2DT0<-glmer(response~1+Complex*Lang+(1|participant),family=binomial(link="logit"),control=glmerContro

anova(mod2DT0,mod2DT)
```

```
## Data: data2DT
## Models:
## mod2DT0: response ~ 1 + Complex * Lang + (1 | participant)
## mod2DT: response ~ AgeGroup + Complex * Lang + (1 | participant)
##         Df    AIC    BIC  logLik deviance  Chisq Chi Df Pr(>Chisq)
```

```
## mod2DT0  5 300.48 319.64 -145.24   290.48
## mod2DT   6 218.29 241.28 -103.14   206.29 84.189      1  < 2.2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
################
# Effect of age
################


Z<-subset(data,AgeGroup=="child")
Z$Age<-scale(Z$ageD)

mod12DTAge<-glmer(response~Age*Condition*Complex*Lang+(1+Condition|participant),family=binomial(link="lo
mod12DTAge0<-glmer(response~Condition*Complex*Lang+(1+Condition|participant),family=binomial(link="logit

anova(mod12DTAge, mod12DTAge0)
```

```
## Data: subset(Z)
## Models:
## mod12DTAge0: response ~ Condition * Complex * Lang + (1 + Condition | participant)
## mod12DTAge: response ~ Age * Condition * Complex * Lang + (1 + Condition |
## mod12DTAge:     participant)
##             Df    AIC    BIC  logLik deviance  Chisq Chi Df Pr(>Chisq)
## mod12DTAge0 11 367.40 410.12 -172.70   345.40
## mod12DTAge  19 379.52 453.30 -170.76   341.52 3.8807      8     0.8677
```

```
summary(mod12DTAge)
```

```
## Generalized linear mixed model fit by maximum likelihood (Laplace
##   Approximation) [glmerMod]
##  Family: binomial  ( logit )
## Formula: response ~ Age * Condition * Complex * Lang + (1 + Condition |
##     participant)
##    Data: subset(Z)
## Control:
## glmerControl(optimizer = "bobyqa", optCtrl = list(maxfun = 5e+06))
##
##      AIC      BIC   logLik deviance df.resid
##    379.5    453.3   -170.8    341.5      340
##
## Scaled residuals:
##     Min      1Q  Median      3Q     Max
## -2.2885 -0.3425  0.1031  0.3782  2.0158
##
## Random effects:
##  Groups      Name        Variance Std.Dev. Corr
##  participant (Intercept) 3.092    1.758
##              Condition1  4.218    2.054    -0.42
## Number of obs: 359, groups:  participant, 46
##
## Fixed effects:
##                                 Estimate Std. Error z value Pr(>|z|)
## (Intercept)                      1.55178    0.57674   2.691  0.00713 **
## Age                              0.12911    0.41164   0.314  0.75379
```

```
## Condition1                       -1.66697    0.60250  -2.767  0.00566 **
## Complex1                          0.15020    0.38655   0.389  0.69760
## Lang1                             0.11815    0.38643   0.306  0.75980
## Age:Condition1                    0.21423    0.45472   0.471  0.63755
## Age:Complex1                     -0.52683    0.40791  -1.292  0.19652
## Condition1:Complex1              -0.05911    0.42675  -0.138  0.88983
## Age:Lang1                         0.09224    0.40843   0.226  0.82132
## Condition1:Lang1                  0.16536    0.42676   0.388  0.69840
## Complex1:Lang1                   -0.94583    0.40388  -2.342  0.01919 *
## Age:Condition1:Complex1          -0.17760    0.45106  -0.394  0.69377
## Age:Condition1:Lang1             -0.02787    0.45069  -0.062  0.95069
## Age:Complex1:Lang1                0.01530    0.40949   0.037  0.97020
## Condition1:Complex1:Lang1         0.31193    0.44202   0.706  0.48039
## Age:Condition1:Complex1:Lang1  0.29859    0.45209   0.660  0.50896
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

##
## Correlation matrix not shown by default, as p = 16 > 12.
## Use print(x, correlation=TRUE)  or
##   vcov(x)     if you need it
```

References

Crain, Stephen, and Rosalind Thornton. 1998. *Investigations in Universal Grammar: A Guide to Experiments on the Acquisition of Syntax and Semantics.* MIT Press.

Singh, Raj, Ken Wexler, Andrea Astle-Rahim, Deepthi Kamawar, and Danny Fox. 2016. "Children Interpret Disjunction as Conjunction: Consequences for Theories of Implicature and Child Development." *Natural Language Semantics* 24 (4): 305–52. doi:10.1007/s11050-016-9126-3.

Tieu, L., K. Yatsushiro, A. Cremers, J. Romoli, U. Sauerland, and E. Chemla. 2016. "On the Role of Alternatives in the Acquisition of Simple and Complex Disjunctions in French and Japanese." *Journal of Semantics.*