results\_markdown

ASM

13/01/2023 last updated 01/05/2023

## Data call in, and methods participant information

kable(FE\_ethnicity)

| strategy | child\_ethnicity | n | prop | perc |
| --- | --- | --- | --- | --- |
| both-parents-bilingual | african | 2 | 0.0206 | 2.062 |
| both-parents-bilingual | canadian | 14 | 0.1443 | 14.433 |
| both-parents-bilingual | caribean | 2 | 0.0206 | 2.062 |
| both-parents-bilingual | east\_and\_southest\_asian | 1 | 0.0103 | 1.031 |
| both-parents-bilingual | european | 49 | 0.5052 | 50.516 |
| both-parents-bilingual | indian | 1 | 0.0103 | 1.031 |
| both-parents-bilingual | indigenous | 1 | 0.0103 | 1.031 |
| both-parents-bilingual | latino | 1 | 0.0103 | 1.031 |
| both-parents-bilingual | mixed\_african\_east\_and\_southeast\_asian | 1 | 0.0103 | 1.031 |
| both-parents-bilingual | mixed\_arab\_european | 3 | 0.0309 | 3.093 |
| both-parents-bilingual | mixed\_canadian\_chinese\_vietnamese | 1 | 0.0103 | 1.031 |
| both-parents-bilingual | mixed\_caribean\_canadian | 1 | 0.0103 | 1.031 |
| both-parents-bilingual | mixed\_caribean\_quebec | 1 | 0.0103 | 1.031 |
| both-parents-bilingual | mixed\_caribean\_south\_asian | 1 | 0.0103 | 1.031 |
| both-parents-bilingual | mixed\_european\_australian | 1 | 0.0103 | 1.031 |
| both-parents-bilingual | mixed\_european\_canadian | 2 | 0.0206 | 2.062 |
| both-parents-bilingual | mixed\_european\_caribean | 2 | 0.0206 | 2.062 |
| both-parents-bilingual | mixed\_european\_east\_and\_southeast\_asian | 3 | 0.0309 | 3.093 |
| both-parents-bilingual | mixed\_european\_east\_and\_southeast\_asian\_canadian | 2 | 0.0206 | 2.062 |
| both-parents-bilingual | mixed\_european\_indigenous | 1 | 0.0103 | 1.031 |
| both-parents-bilingual | mixed\_european\_latino | 1 | 0.0103 | 1.031 |
| both-parents-bilingual | mixed\_european\_russian\_irish | 1 | 0.0103 | 1.031 |
| both-parents-bilingual | mixed\_north\_african\_italian\_quebec\_france | 1 | 0.0103 | 1.031 |
| both-parents-bilingual | mixed\_west\_asian\_french\_canadian | 1 | 0.0103 | 1.031 |
| both-parents-bilingual | north-american | 1 | 0.0103 | 1.031 |
| both-parents-bilingual | quebec | 1 | 0.0103 | 1.031 |
| both-parents-bilingual | west\_asian | 1 | 0.0103 | 1.031 |
| one-language-at-home | canadian | 1 | 0.1429 | 14.286 |
| one-language-at-home | caribean | 1 | 0.1429 | 14.286 |
| one-language-at-home | european | 3 | 0.4286 | 42.857 |
| one-language-at-home | mixed\_european\_caribean\_indigenous\_african | 1 | 0.1429 | 14.286 |
| one-language-at-home | mixed\_european\_indigenous | 1 | 0.1429 | 14.286 |
| one-parent-bilingual | african | 1 | 0.0204 | 2.041 |
| one-parent-bilingual | canadian | 2 | 0.0408 | 4.082 |
| one-parent-bilingual | caribean | 5 | 0.1020 | 10.204 |
| one-parent-bilingual | european | 19 | 0.3878 | 38.776 |
| one-parent-bilingual | indigenous | 1 | 0.0204 | 2.041 |
| one-parent-bilingual | latino | 3 | 0.0612 | 6.122 |
| one-parent-bilingual | mixed\_african\_caribean | 1 | 0.0204 | 2.041 |
| one-parent-bilingual | mixed\_african\_indigenous | 1 | 0.0204 | 2.041 |
| one-parent-bilingual | mixed\_canadian\_australian | 1 | 0.0204 | 2.041 |
| one-parent-bilingual | mixed\_canadian\_greek\_ethiopian | 1 | 0.0204 | 2.041 |
| one-parent-bilingual | mixed\_caribean\_european | 1 | 0.0204 | 2.041 |
| one-parent-bilingual | mixed\_european\_african | 2 | 0.0408 | 4.082 |
| one-parent-bilingual | mixed\_european\_canadian\_british | 1 | 0.0204 | 2.041 |
| one-parent-bilingual | mixed\_european\_caribean | 1 | 0.0204 | 2.041 |
| one-parent-bilingual | mixed\_european\_east\_and\_south\_asian | 1 | 0.0204 | 2.041 |
| one-parent-bilingual | mixed\_european\_latino | 1 | 0.0204 | 2.041 |
| one-parent-bilingual | mixed\_european\_latino\_canadian | 1 | 0.0204 | 2.041 |
| one-parent-bilingual | mixed\_european\_lebanese | 1 | 0.0204 | 2.041 |
| one-parent-bilingual | mixed\_european\_southasian | 1 | 0.0204 | 2.041 |
| one-parent-bilingual | mixed\_greek\_lebanese | 1 | 0.0204 | 2.041 |
| one-parent-bilingual | mixed\_italian\_british\_indigenous\_caribean | 1 | 0.0204 | 2.041 |
| one-parent-bilingual | mixed\_latino\_scotish | 1 | 0.0204 | 2.041 |
| one-parent-bilingual | quebec | 1 | 0.0204 | 2.041 |
| one-parent-one-lang | african | 1 | 0.0270 | 2.703 |
| one-parent-one-lang | canadian | 2 | 0.0541 | 5.405 |
| one-parent-one-lang | european | 20 | 0.5405 | 54.054 |
| one-parent-one-lang | indigenous | 2 | 0.0541 | 5.405 |
| one-parent-one-lang | mixed\_arab\_caribean | 1 | 0.0270 | 2.703 |
| one-parent-one-lang | mixed\_canadian\_caribean | 1 | 0.0270 | 2.703 |
| one-parent-one-lang | mixed\_caribean\_european | 1 | 0.0270 | 2.703 |
| one-parent-one-lang | mixed\_european\_arab\_indigenous | 1 | 0.0270 | 2.703 |
| one-parent-one-lang | mixed\_european\_canadian | 1 | 0.0270 | 2.703 |
| one-parent-one-lang | mixed\_european\_caribean\_african | 1 | 0.0270 | 2.703 |
| one-parent-one-lang | mixed\_european\_east\_and\_southeast\_asian | 1 | 0.0270 | 2.703 |
| one-parent-one-lang | mixed\_european\_indigenous | 1 | 0.0270 | 2.703 |
| one-parent-one-lang | mixed\_european\_latino | 1 | 0.0270 | 2.703 |
| one-parent-one-lang | mixed\_european\_latino\_arab | 1 | 0.0270 | 2.703 |
| one-parent-one-lang | mixed\_european\_southasian | 1 | 0.0270 | 2.703 |
| one-parent-one-lang | mixed\_latino\_canadian | 1 | 0.0270 | 2.703 |
| single-parent | african | 1 | 0.2000 | 20.000 |
| single-parent | european | 2 | 0.4000 | 40.000 |
| single-parent | indigenous | 1 | 0.2000 | 20.000 |
| single-parent | mixed\_european\_latino | 1 | 0.2000 | 20.000 |

## Study 1: French-English data analyses

## Study 2: French/English– heritage data analyses

## Extra Analyses

library(sjPlot)

## Warning: package 'sjPlot' was built under R version 4.3.2

## Install package "strengejacke" from GitHub (`devtools::install\_github("strengejacke/strengejacke")`) to load all sj-packages at once!

library(sjlabelled)

## Warning: package 'sjlabelled' was built under R version 4.3.2

##   
## Attaching package: 'sjlabelled'

## The following object is masked from 'package:forcats':  
##   
## as\_factor

## The following object is masked from 'package:dplyr':  
##   
## as\_label

## The following object is masked from 'package:ggplot2':  
##   
## as\_label

library(sjmisc)

## Warning: package 'sjmisc' was built under R version 4.3.2

## Install package "strengejacke" from GitHub (`devtools::install\_github("strengejacke/strengejacke")`) to load all sj-packages at once!

##   
## Attaching package: 'sjmisc'

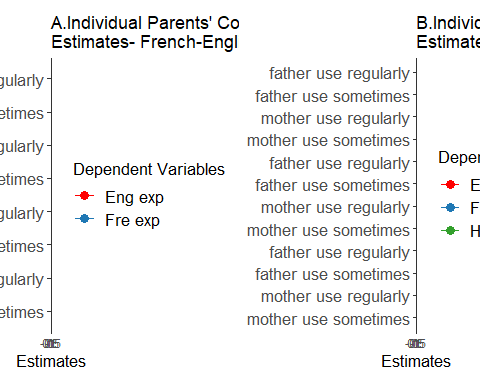
## The following objects are masked from 'package:janitor':  
##   
## remove\_empty\_cols, remove\_empty\_rows

## The following object is masked from 'package:purrr':  
##   
## is\_empty

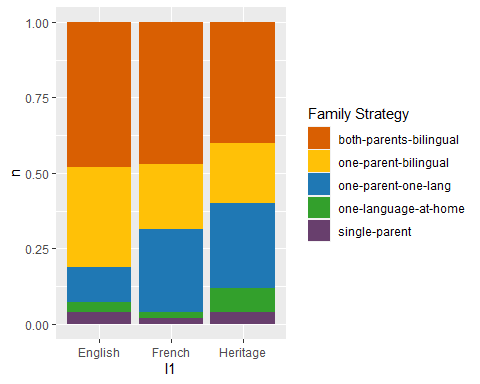
## The following object is masked from 'package:tidyr':  
##   
## replace\_na

## The following object is masked from 'package:tibble':  
##   
## add\_case

ov1\_labels<- c("mother use sometimes", "mother use regularly", "father use sometimes", "father use regularly", "mother use sometimes", "mother use regularly","father use sometimes", "father use regularly")  
  
ov1<- plot\_models(lm\_parents\_aditive\_eng, lm\_parents\_aditive\_fre, show.values = TRUE, show.p = T, title = "A.Individual Parents' Contributions Model Estimates- French-English Sample", axis.labels = ov1\_labels, axis.lim = c(-1,1), vline.color = "black", colors = c(my\_blue, "red"), m.labels= c("Eng exp", "Fre exp"))+ theme\_bw() +  
 theme(axis.text.y = element\_text(size=13), axis.title.x = element\_text(size=13), legend.text = element\_text(size=13), legend.title = element\_text(size=13))   
  
  
ov2\_labels<- c("mother use sometimes", "mother use regularly", "father use sometimes", "father use regularly", "mother use sometimes", "mother use regularly","father use sometimes", "father use regularly", "mother use sometimes", "mother use regularly","father use sometimes", "father use regularly")  
  
  
ov2<- plot\_models(her\_lm\_parents\_aditive\_eng, her\_lm\_parents\_aditive\_fre, her\_lm\_parents\_aditive\_her, show.values = T, show.p = T, title = "B.Individual Parents' Contributions Model Estimates- Heritage Sample", axis.labels = ov2\_labels, axis.lim = c(-1,1), vline.color = "black", colors = c(my\_green, my\_blue, "red"), m.labels= c("Eng exp", "Fre exp", "Heritage exp"))+ theme\_bw()+  
 theme(axis.text.y = element\_text(size=13), axis.title.x = element\_text(size=13), legend.text = element\_text(size=13), legend.title = element\_text(size=13))   
  
  
other\_visualization<- ov1+ov2  
  
print(other\_visualization)



## Extra code  
  
######## FOR THE WHOLE SAMPLE ############  
  
#Calculating how many families use each strategy and its corresponding %  
prop\_strategy<- first\_visit\_only %>%  
group\_by(strategy) %>%  
 tally() %>%  
 mutate(prop = n/sum(n)) %>%  
 mutate(perc= prop\*100)  
  
#Reordering levels so legend in the graph is in order.  
prop\_strategy$strategy<- factor(prop\_strategy$strategy, levels= c("both-parents-bilingual", "one-parent-bilingual", "one-parent-one-lang", "one-language-at-home", "single-parent"))  
  
prop\_strategy<- prop\_strategy %>%  
 arrange(desc(prop))  
  
#Creating dataframes of each strategy to save their percentages and prnt them on the text  
  
##Both parents bilingual  
both\_parents\_biling<- prop\_strategy %>%  
 filter(strategy=="both-parents-bilingual") %>%  
 select(perc)  
  
perc\_both\_parents\_biling<- round(both\_parents\_biling$perc, 1)  
  
##One parent bilingual  
one\_parent\_biling<- prop\_strategy %>%  
 filter(strategy=="one-parent-bilingual") %>%  
 select(perc)  
  
perc\_one\_parents\_biling<- round(one\_parent\_biling$perc, 1)  
  
  
##One parent one lang  
one\_parent\_one\_lang<- prop\_strategy %>%  
 filter(strategy=="one-parent-one-lang") %>%  
 select(perc)  
  
perc\_one\_parent\_one\_lang<- round(one\_parent\_biling$perc, 1)  
  
##one language at home  
one\_language\_at\_home<- prop\_strategy %>%  
 filter(strategy=="one-language-at-home") %>%  
 select(perc)  
  
perc\_one\_language\_at\_home<- round(one\_parent\_biling$perc, 1)  
  
  
#Waffle plot  
V1<- setNames(prop\_strategy$n, c("both-parents-bilingual", "one-parent-bilingual", "one-parent-one-lanaguage", "one-language-at-home", "single-parent"))  
  
figure\_1<- waffle(parts = V1, rows=20, colors = c(my\_orange, my\_yellow, my\_blue, my\_green, my\_purple), keep = T, title = "Proportion of Use of Family Strategies", size=0.6)   
  
  
#Making a figure of most used strategies divided by lang exposure  
for\_breakdown <- first\_visit\_only %>%  
 mutate(l1 = case\_when(l1=="French" ~ "French",  
 l1=="English" ~ "English",  
 TRUE ~ "Heritage")) %>%  
group\_by(strategy, l1) %>%  
 tally() %>%  
 mutate(prop = n/sum(n)) %>%  
 mutate(perc= prop\*100)  
  
for\_breakdown$strategy<- factor(for\_breakdown$strategy, levels= c("both-parents-bilingual", "one-parent-bilingual", "one-parent-one-lang", "one-language-at-home", "single-parent"))  
  
ggplot(for\_breakdown, aes(x=l1, y=n, fill=strategy)) +   
 geom\_bar(stat="identity", position="fill") +  
 scale\_fill\_manual (name = "Family Strategy", values =c(my\_orange, my\_yellow, my\_blue, my\_green, my\_purple))



#collapse\_rows\_df <- function(df, variable){  
 #group\_var <- enquo(variable)  
 #df %>%  
 # group\_by(!! group\_var) %>%  
 #mutate(groupRow = 1:n()) %>%  
 #ungroup() %>%  
 #mutate(!!quo\_name(group\_var) := ifelse(groupRow == 1, as.character(!! group\_var), "")) %>%  
 #select(-c(groupRow))  
#}  
  
#strats\_table<- final\_data\_strat %>%  
 # select(c(strategy, care1\_l1, care1\_l2, care2\_l1, care2\_l2))%>%  
 #rename(caregiver\_A\_L1 = care1\_l1)%>%  
 #rename(caregiver\_A\_L2 = care1\_l2)%>%  
 #rename(caregiver\_B\_L1 = care2\_l1)%>%  
 #rename(caregiver\_B\_L2 = care2\_l2)%>%  
 #arrange(strategy) %>%  
 #distinct() %>%  
 #collapse\_rows\_df(strategy)  
  
  
#color\_formatter <- formatter(  
 # "span",  
# style = x ~ style(  
 # color = 'black',  
 # 'background-color' =  
 # ifelse(x == "regularly", "#a1d76a", ifelse( x=="sometimes","#ffffbf", if\_else(x=="never", "#e9a3c9", "white")))  
 # ))  
  
 #formattable(strats\_table,  
 # list(  
 # `caregiver\_A\_L1`= color\_formatter,  
 # `caregiver\_A\_L2`= color\_formatter,  
 # `caregiver\_B\_L1`= color\_formatter,  
 # `caregiver\_B\_L2`= color\_formatter  
 # )) %>%  
 #as.datatable(options = list(pageLength = 35)) %>%  
 #spk\_add\_deps() -> w  
  
#htmlwidgets::saveWidget(w, "table.html", selfcontained = TRUE)  
#webshot::webshot(url = "table.html", file = "table.png",   
 # vwidth = 1200, vheight = 275)  
  
  
FE\_mother\_long\_analyses <- FE\_long\_analyses %>%   
 filter(!strategy=="single-parent") %>%  
 select(anon\_baby\_id, unique\_id, l1, l2, care1\_l1, care1\_l2, visit, strategy, length\_between\_visits) %>%  
 mutate(caregiver\_1\_french\_use = case\_when(l1=="French"~care1\_l1,  
 l2=="French"~care1\_l2)) %>%  
 mutate(caregiver\_1\_english\_use = case\_when(l1=="English"~care1\_l1,  
 l2=="English"~care1\_l2)) %>%  
 mutate(individual\_strategy\_mother = case\_when( caregiver\_1\_french\_use %in% c("regularly", "sometimes") & caregiver\_1\_english\_use %in% c("regularly", "sometimes") ~ "mother\_bilingual" ,  
 TRUE ~ "mother\_monolingual"  
 ))  
  
  
FE\_father\_long\_analyses <- FE\_long\_analyses %>%   
 filter(!strategy=="single-parent") %>%  
 select(anon\_baby\_id, unique\_id, l1, l2, care2\_l1, care2\_l2, visit, strategy, length\_between\_visits) %>%  
 mutate(caregiver\_2\_french\_use = case\_when(l1=="French"~ care2\_l1,  
 l2=="French"~ care2\_l2)) %>%  
 mutate(caregiver\_2\_english\_use = case\_when(l1=="English"~care2\_l1,  
 l2=="English"~care2\_l2)) %>%  
 mutate(individual\_strategy\_father = case\_when( caregiver\_2\_french\_use %in% c("regularly", "sometimes") & caregiver\_2\_english\_use %in% c("regularly", "sometimes") ~ "father\_bilingual" ,  
 TRUE ~ "father\_monolingual"  
 ))  
  
FE\_mother\_father\_long <- inner\_join(FE\_mother\_long\_analyses, FE\_father\_long\_analyses)

## Joining with `by = join\_by(anon\_baby\_id, unique\_id, l1, l2, visit, strategy,  
## length\_between\_visits)`

FE\_mother\_father\_long <- FE\_mother\_father\_long %>%  
 select(anon\_baby\_id, visit, individual\_strategy\_mother, individual\_strategy\_father, strategy, length\_between\_visits) %>%  
 filter(visit == c(1,2)) %>%  
 mutate(visit = as.character(as.numeric(visit)))%>%  
 mutate(visit\_a = visit) %>%#need two visit columns to give the df the appropriate shape for the sankey graph  
 mutate(visit\_b= visit) %>%  
 pivot\_wider(names\_from = visit, values\_from = strategy) %>%  
 rename("time\_1\_FLS" = "1") %>%  
 rename("time\_2\_FLS" = "2")

## Warning: There was 1 warning in `filter()`.  
## ℹ In argument: `visit == c(1, 2)`.  
## Caused by warning in `visit == c(1, 2)`:  
## ! longer object length is not a multiple of shorter object length

FE\_mother\_father\_long <- FE\_mother\_father\_long %>%  
 pivot\_wider(names\_from = visit\_a, values\_from = individual\_strategy\_mother) %>%   
 rename("time\_1\_Mom" = "1") %>%  
 rename("time\_2\_Mom" = "2")   
   
 FE\_mother\_father\_long <- FE\_mother\_father\_long %>%  
 pivot\_wider(names\_from = visit\_b, values\_from = individual\_strategy\_father) %>%  
 rename("time\_1\_Dad" = "1") %>%  
 rename("time\_2\_Dad" = "2")   
   
 FE\_mother\_father\_long <- FE\_mother\_father\_long %>%  
 group\_by(anon\_baby\_id)%>%  
 summarise\_all(na.omit) %>%#Collapsing IDs so that there is one row per baby cause otherwise the sankey wont work  
 ungroup()

## Warning: Returning more (or less) than 1 row per `summarise()` group was deprecated in  
## dplyr 1.1.0.  
## ℹ Please use `reframe()` instead.  
## ℹ When switching from `summarise()` to `reframe()`, remember that `reframe()`  
## always returns an ungrouped data frame and adjust accordingly.  
## ℹ The deprecated feature was likely used in the dplyr package.  
## Please report the issue at <https://github.com/tidyverse/dplyr/issues>.  
## This warning is displayed once every 8 hours.  
## Call `lifecycle::last\_lifecycle\_warnings()` to see where this warning was  
## generated.

##Make sankey graph  
  
FE\_mom\_for\_sankey <- FE\_mother\_father\_long %>%  
 make\_long("time\_1\_FLS","time\_1\_Mom", "time\_2\_Mom", "time\_2\_FLS")   
  
FE\_indi\_mom\_p1<- ggplot(FE\_mom\_for\_sankey , aes(x = x,   
 next\_x = next\_x,   
 node = node,   
 next\_node = next\_node,  
 fill = factor(node), label=node)) +  
 geom\_sankey(flow.color = "black") +   
 scale\_fill\_manual(name= "x", values = c(my\_yellow,"#F66D7A","#8b2e57",my\_green, my\_blue, my\_orange)) +   
 geom\_sankey\_label(size=5, color="black", fill="white")+  
 theme\_bw()+  
 theme(legend.position = "none")  
  
FE\_dad\_for\_sankey <- FE\_mother\_father\_long %>%  
 make\_long("time\_1\_FLS","time\_1\_Dad", "time\_2\_Dad", "time\_2\_FLS")   
  
FE\_indi\_dad\_p1<- ggplot(FE\_dad\_for\_sankey , aes(x = x,   
 next\_x = next\_x,   
 node = node,   
 next\_node = next\_node,  
 fill = factor(node), label=node)) +  
 geom\_sankey(flow.color = "black") +   
 scale\_fill\_manual(name= "x", values = c(my\_yellow,"#F66D7A","#8b2e57",my\_green, my\_blue, my\_orange)) +   
 geom\_sankey\_label(size=5, color="black", fill="white")+  
 theme\_bw()