

Disability Covid Narratives Analyses

Raffles Cowan

2024-10-20

```

knitr::opts_chunk$set(echo = TRUE)

library(haven)
library(tidyverse)
library(psych)
library(lme4)
library(mlmhelpR)
library(lmerTest)
library(effects)
library(gridExtra)
library(sjPlot)
library(reghelper)
library(emmeans)

# Read dataset
dc_long <- read_sav("Datasets/Longitudinal COVID-19 Disability HLM Datafile_AnalyticSample_Long.
sav")

# Rename narrative vars with more descriptive names
dc_long <- dc_long %>%
  rename(AGENCY = HIGH_AGENCY,
         COMMUNION = HIGH_COMMUNION,
         SUBMISSIVENESS = LOW_AGENCY,
         DISCONNECTION = LOW_COMMUNION)

# Preprocessing: Define analysis dataset and calculate needed variables
dc_long_strict <- dc_long %>%
  group_by(LinkingID) %>%
  filter(sum(!is.na(INTERDEPENDENCE), na.rm = T)==3) %>%
  mutate(INTERDEPENDENCE_between = mean(INTERDEPENDENCE, na.rm = T),
         INDEPENDENCE_between = mean(INDEPENDENCE, na.rm = T),
         DEPENDENCE_between = mean(DEPENDENCE, na.rm = T),
         AGENCY_between = mean(AGENCY, na.rm = T),
         SUBMISSIVENESS_between = mean(SUBMISSIVENESS, na.rm = T),
         COMMUNION_between = mean(COMMUNION, na.rm = T),
         DISCONNECTION_between = mean(DISCONNECTION, na.rm = T),
         PWB_RC_between = mean(PWB_RC, na.rm = T)) %>%
  ungroup() %>%
  mutate(time_cent = time-1,
         INTERDEPENDENCE_within = INTERDEPENDENCE-INTERDEPENDENCE_between,
         INDEPENDENCE_within = INDEPENDENCE-INDEPENDENCE_between,
         DEPENDENCE_within = DEPENDENCE-DEPENDENCE_between,
         AGENCY_within = AGENCY-AGENCY_between,
         SUBMISSIVENESS_within = SUBMISSIVENESS-SUBMISSIVENESS_between,
         COMMUNION_within = COMMUNION-COMMUNION_between,
         DISCONNECTION_within = DISCONNECTION-DISCONNECTION_between,
         PWB_RC_within = PWB_RC-PWB_RC_between,
         INTERDEPENDENCE_between_sqrt = sqrt(INTERDEPENDENCE_between + .01),
         INDEPENDENCE_between_sqrt = sqrt(INDEPENDENCE_between + .01),
         DEPENDENCE_between_sqrt = sqrt(DEPENDENCE_between + .01),
         AGENCY_between_sqrt = sqrt(AGENCY_between + .01)) %>%
  mutate(INTERDEPENDENCE_between_cent = scale(INTERDEPENDENCE_between, scale = F)[,1],

```

```

INDEPENDENCE_between_cent = scale(INDEPENDENCE_between, scale = F)[,1],
DEPENDENCE_between_cent = scale(DEPENDENCE_between, scale = F)[,1],
AGENCY_between_cent = scale(AGENCY_between, scale = F)[,1],
SUBMISSIVENESS_between_cent = scale(SUBMISSIVENESS_between, scale = F)[,1],
COMMUNION_between_cent = scale(COMMUNION_between, scale = F)[,1],
DISCONNECTION_between_cent = scale(DISCONNECTION_between, scale = F)[,1],
PWB_RC_between_cent = scale(PWB_RC_between, scale = F)[,1],
INTERDEPENDENCE_between_sqrt_cent = scale(INTERDEPENDENCE_between, scale = F)[,1],
INDEPENDENCE_between_sqrt_cent = scale(INDEPENDENCE_between, scale = F)[,1],
DEPENDENCE_between_sqrt_cent = scale(DEPENDENCE_between, scale = F)[,1],
AGENCY_between_sqrt_cent = scale(AGENCY_between, scale = F)[,1]) %>%
zap_label()

# Define functions for moderation analyses
dc_lmer <- function(outcome, predictor, data){
  if(grepl("INTERDEPENDENCE|INDEPENDENCE|DEPENDENCE|AGENCY", predictor)){ # Formula for square root transformed vars
    formula <- as.formula(paste0(outcome, " ~ time_cent * ", predictor, "_between_sqrt_cent + time_cent * ", predictor, "_within + (time_cent|LinkingID)", sep = ""))
  }else{ # Formula for non-square root transformed vars
    formula <- as.formula(paste0(outcome, " ~ time_cent * ", predictor, "_between_cent + time_cent * ", predictor, "_within + (time_cent|LinkingID)", sep = ""))
  }
  model <- lmer(formula, data)
  return(model)
}

# Define function for main effects analyses
dc_lmer_main <- function(outcome, predictor, data){
  if(grepl("INTERDEPENDENCE|INDEPENDENCE|DEPENDENCE|AGENCY", predictor)){ # Formula for square root transformed vars
    formula <- as.formula(paste0(outcome, " ~ time_cent + ", predictor, "_within + ", predictor, "_between_sqrt_cent + (time_cent|LinkingID)", sep = ""))
  }else{ # Formula for non-square root transformed vars
    formula <- as.formula(paste0(outcome, " ~ time_cent + ", predictor, "_within + ", predictor, "_between_cent + (time_cent|LinkingID)", sep = ""))
  }
  model <- lmer(formula, data)
  return(model)
}

# Define function for moderation analyses with covariates
dc_lmer_cov <- function(outcome, predictor, data){
  if(grepl("INTERDEPENDENCE|INDEPENDENCE|DEPENDENCE|AGENCY", predictor)){ # Formula for square root transformed vars
    formula <- as.formula(paste0(outcome, " ~ time_cent * ", predictor, "_between_sqrt_cent + time_cent * ", predictor, "_within + pre_mh + age + gender_f + gender_tgd + education + (time_cent|LinkingID)", sep = ""))
  }else{ # Formula for non-square root transformed vars
    formula <- as.formula(paste0(outcome, " ~ time_cent * ", predictor, "_between_cent + time_cent * ", predictor, "_within + pre_mh + age + gender_f + gender_tgd + education + (time_cent|LinkingID)", sep = ""))
  }

```

```

}
model <- lmer(formula, data)
return(model)
}

# Define function for plotting change over time in narrative variables
change_plot <- function(model, outcome_for_plot){
  effect <- Effect("time_cent", model,
                  xlevels = list(time_cent = c(0, 1, 2))) %>%
    as.data.frame() %>%
    mutate(Year = time_cent + 2020)
  eff_plot <- ggplot(effect, aes(x = Year, y = fit)) +
    geom_line(linewidth=1.2) +
    labs(title = outcome_for_plot,
         x = "Year",
         y = outcome_for_plot) +
    theme_light() +
    theme(text=element_text(size=10), aspect.ratio=1.2, panel.grid = element_blank(),
          legend.position = "none"
    ) +
    scale_x_continuous(breaks = c(2020, 2021, 2022)) +
    coord_cartesian(xlim = c(2019.75, 2022.25),
                   ylim = c(0, 2))
  return(eff_plot)
}

```

Disability COVID Narratives: Linear Mixed Effects Models of Change Over Time

Research Question: Were narrative identity themes (particularly themes of interdependence) associated with change over time in well-being during the COVID pandemic for individuals with disabilities?

Preliminary Analyses

Table S1

Descriptive statistics of within- and between-person variables

```

dc_long_strict %>%
  group_by(LinkingID) %>%
  slice(1) %>%
  ungroup() %>%
  select(PWB_RC_between, INTERDEPENDENCE_between:DISCONNECTION_between,
         WORD_COUNT_MEAN, age, race_binary, employment_binary) %>%
  describe()

```

```
##          vars    n  mean    sd median trimmed  mad   min
## PWB_RC_between      1 108   0.04   0.70   0.08   0.10  0.67 -1.77
## INTERDEPENDENCE_between  2 108   0.08   0.11   0.00   0.05  0.00  0.00
## INDEPENDENCE_between   3 108   0.13   0.17   0.11   0.10  0.16  0.00
## DEPENDENCE_between     4 108   0.27   0.26   0.22   0.24  0.33  0.00
## AGENCY_between        5 108   0.28   0.27   0.22   0.24  0.33  0.00
## SUBMISSIVENESS_between  6 108   0.65   0.32   0.67   0.65  0.33  0.00
## COMMUNION_between      7 108   0.35   0.27   0.33   0.33  0.33  0.00
## DISCONNECTION_between  8 108   0.49   0.30   0.44   0.47  0.33  0.00
## WORD_COUNT_MEAN       9 108 102.44 100.98  75.67  88.86 77.10  5.00
## age                 10 108  35.72  10.96  33.00  34.41  8.90 19.00
## race_binary         11 108   0.88   0.33   1.00   0.97  0.00  0.00
## employment_binary    12 108   0.71   0.45   1.00   0.76  0.00  0.00
##          max range  skew kurtosis   se
## PWB_RC_between      1.27   3.04 -0.68   0.13 0.07
## INTERDEPENDENCE_between 0.44   0.44  1.63   2.13 0.01
## INDEPENDENCE_between  0.67   0.67  1.28   0.80 0.02
## DEPENDENCE_between    1.33   1.33  1.17   1.50 0.03
## AGENCY_between        1.11   1.11  1.02   0.57 0.03
## SUBMISSIVENESS_between 1.56   1.56  0.18  -0.47 0.03
## COMMUNION_between     1.11   1.11  0.65  -0.34 0.03
## DISCONNECTION_between  1.33   1.33  0.51  -0.24 0.03
## WORD_COUNT_MEAN      801.33 796.33  3.33  19.09 9.72
## age                 71.00  52.00  1.14   1.01 1.05
## race_binary          1.00   1.00 -2.30   3.33 0.03
## employment_binary     1.00   1.00 -0.93  -1.15 0.04
```

```
dc_long_strict %>%
  select(PWB_RC_within, INTERDEPENDENCE_within:DISCONNECTION_within) %>%
  describe()
```

```
##          vars    n mean    sd median trimmed  mad   min max range
## PWB_RC_within      1 324   0 0.31   0.01   0.00 0.30 -0.98 0.91  1.90
## INTERDEPENDENCE_within  2 324   0 0.14   0.00  -0.01 0.00 -0.44 0.56  1.00
## INDEPENDENCE_within   3 324   0 0.19   0.00  -0.01 0.08 -0.67 0.67  1.33
## DEPENDENCE_within     4 324   0 0.31   0.00  -0.01 0.16 -1.00 1.33  2.33
## AGENCY_within        5 324   0 0.25   0.00  -0.01 0.16 -0.78 0.89  1.67
## SUBMISSIVENESS_within  6 324   0 0.30   0.00   0.00 0.33 -0.78 0.89  1.67
## COMMUNION_within      7 324   0 0.27   0.00   0.00 0.16 -1.00 1.00  2.00
## DISCONNECTION_within  8 324   0 0.30   0.00  -0.01 0.33 -0.78 0.89  1.67
##          skew kurtosis   se
## PWB_RC_within  -0.09   0.22 0.02
## INTERDEPENDENCE_within 0.57   2.39 0.01
## INDEPENDENCE_within  0.68   2.66 0.01
## DEPENDENCE_within    0.41   2.23 0.02
## AGENCY_within        0.42   1.50 0.01
## SUBMISSIVENESS_within 0.17   0.06 0.02
## COMMUNION_within     0.06   1.38 0.01
## DISCONNECTION_within  0.23  -0.12 0.02
```

Table S2

Between-person relationships between study variables

Pearson correlations are shown for all variables, including binary variables.

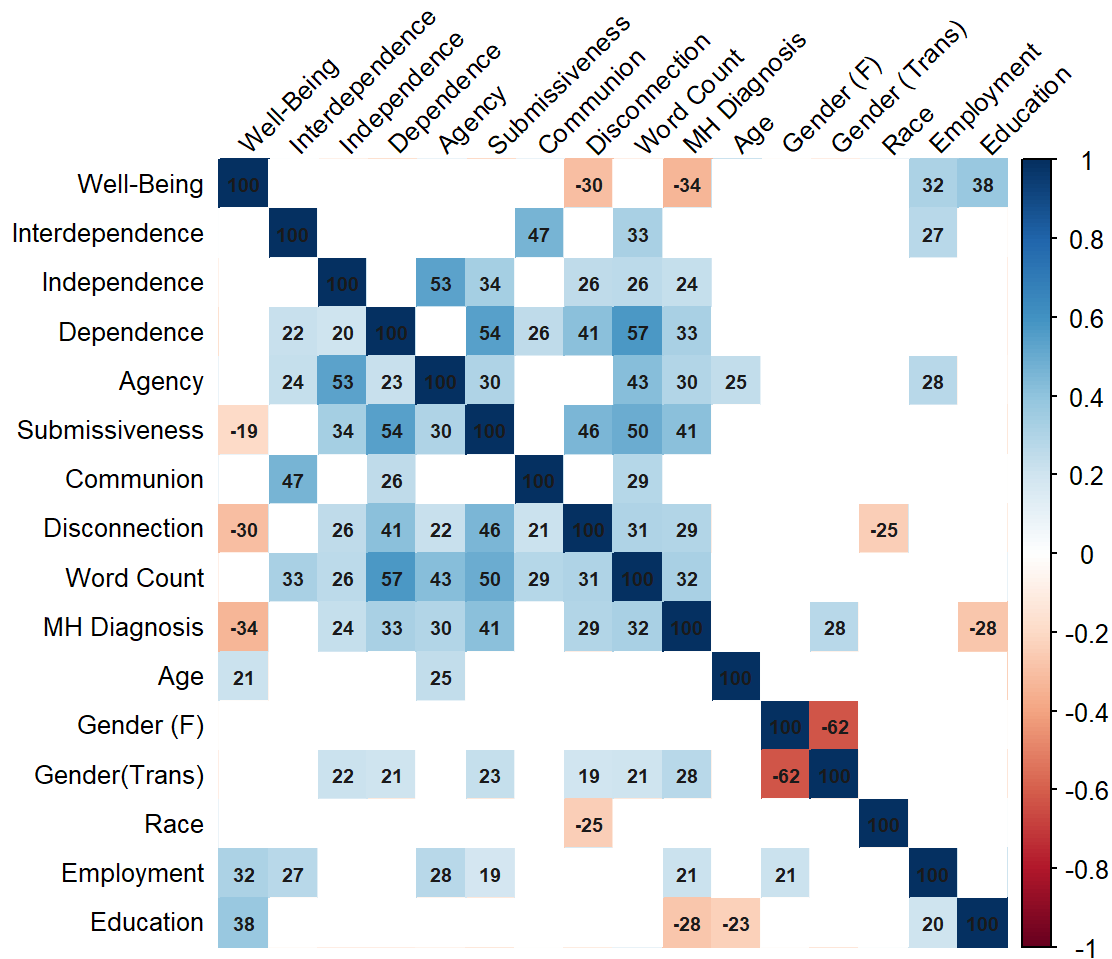
Between-person correlations shown as summary correlation plot (with correlations $p < .05$ uncorrected shown below the diagonal and $p < .05$ FDR-corrected shown above the diagonal) and as full correlation matrix.

```
cors_between <- dc_long_strict %>%
  group_by(LinkingID) %>%
  slice(1) %>%
  ungroup() %>%
  select(PWB_RC_between, INTERDEPENDENCE_between:DISCONNECTION_between,
         WORD_COUNT_MEAN,
         pre_mh, age, gender_f, gender_tgd, race_binary,
         education, employment_binary) %>%
  corr.test(adjust = "fdr")

colnames(cors_between$r) <- c("Well-Being", "Interdependence", "Independence", "Dependence",
                             "Agency", "Submissiveness", "Communion", "Disconnection",
                             "Word Count", "MH Diagnosis", "Age",
                             "Gender (F)", "Gender (Trans)", "Race",
                             "Employment", "Education")
rownames(cors_between$r) <- c("Well-Being", "Interdependence", "Independence", "Dependence",
                              "Agency", "Submissiveness", "Communion", "Disconnection",
                              "Word Count", "MH Diagnosis", "Age",
                              "Gender (F)", "Gender(Trans)", "Race",
                              "Employment", "Education")

corrplot::corrplot(cors_between$r, p.mat = cors_between$p,
                   method = "color", insig = "blank",
                   addCoef.col = "grey10", addCoefasPercent = T, number.cex = .6,
                   tl.cex = .8, tl.srt = 45, tl.col = "black")
```

```
## Warning in corrplot::corrplot(cors_between$r, p.mat = cors_between$p, method =
## "color", : p.mat and corr may be not paired, their rownames and colnames are
## not totally same!
```



cors_between

```
## Call:corr.test(x = ., adjust = "fdr")
## Correlation matrix
##
```

	Well-Being	Interdependence	Independence	Dependence	Agency
## Well-Being	1.00	0.00	-0.07	-0.17	0.09
## Interdependence	0.00	1.00	0.04	0.22	0.24
## Independence	-0.07	0.04	1.00	0.20	0.53
## Dependence	-0.17	0.22	0.20	1.00	0.23
## Agency	0.09	0.24	0.53	0.23	1.00
## Submissiveness	-0.19	0.06	0.34	0.54	0.30
## Communion	0.08	0.47	0.06	0.26	0.15
## Disconnection	-0.30	0.17	0.26	0.41	0.22
## Word Count	-0.09	0.33	0.26	0.57	0.43
## MH Diagnosis	-0.34	0.13	0.24	0.33	0.30
## Age	0.21	-0.06	0.18	-0.01	0.25
## Gender (F)	-0.02	0.02	-0.07	0.11	0.11
## Gender(Trans)	-0.09	0.16	0.22	0.21	0.03
## Race	0.09	-0.17	0.16	-0.11	-0.10
## Employment	0.32	0.27	0.13	0.06	0.28
## Education	0.38	-0.03	-0.09	-0.09	-0.07

```
##
```

	Submissiveness	Communion	Disconnection	Word Count	MH Diagnosis
## Well-Being	-0.19	0.08	-0.30	-0.09	-0.34
## Interdependence	0.06	0.47	0.17	0.33	0.13
## Independence	0.34	0.06	0.26	0.26	0.24
## Dependence	0.54	0.26	0.41	0.57	0.33
## Agency	0.30	0.15	0.22	0.43	0.30
## Submissiveness	1.00	0.06	0.46	0.50	0.41
## Communion	0.06	1.00	0.21	0.29	0.08
## Disconnection	0.46	0.21	1.00	0.31	0.29
## Word Count	0.50	0.29	0.31	1.00	0.32
## MH Diagnosis	0.41	0.08	0.29	0.32	1.00
## Age	-0.02	0.00	-0.09	0.00	-0.01
## Gender (F)	0.10	0.13	0.15	0.08	0.09
## Gender(Trans)	0.23	0.08	0.19	0.21	0.28
## Race	-0.12	-0.11	-0.25	-0.13	-0.05
## Employment	0.19	0.16	0.16	0.18	0.21
## Education	-0.13	0.00	-0.10	0.09	-0.28

```
##
```

	Age	Gender (F)	Gender (Trans)	Race	Employment	Education
## Well-Being	0.21	-0.02	-0.09	0.09	0.32	0.38
## Interdependence	-0.06	0.02	0.16	-0.17	0.27	-0.03
## Independence	0.18	-0.07	0.22	0.16	0.13	-0.09
## Dependence	-0.01	0.11	0.21	-0.11	0.06	-0.09
## Agency	0.25	0.11	0.03	-0.10	0.28	-0.07
## Submissiveness	-0.02	0.10	0.23	-0.12	0.19	-0.13
## Communion	0.00	0.13	0.08	-0.11	0.16	0.00
## Disconnection	-0.09	0.15	0.19	-0.25	0.16	-0.10
## Word Count	0.00	0.08	0.21	-0.13	0.18	0.09
## MH Diagnosis	-0.01	0.09	0.28	-0.05	0.21	-0.28
## Age	1.00	0.00	-0.07	0.07	0.02	-0.23
## Gender (F)	0.00	1.00	-0.62	-0.01	0.21	-0.01
## Gender(Trans)	-0.07	-0.62	1.00	-0.10	0.06	-0.14
## Race	0.07	-0.01	-0.10	1.00	-0.06	0.02
## Employment	0.02	0.21	0.06	-0.06	1.00	0.20

```

## Education      -0.23      -0.01      -0.14  0.02      0.20      1.00
## Sample Size
## [1] 108
## Probability values (Entries above the diagonal are adjusted for multiple tests.)
##                PWB_RC_between INTERDEPENDENCE_between
## PWB_RC_between                0.00                0.98
## INTERDEPENDENCE_between        0.98                0.00
## INDEPENDENCE_between           0.46                0.66
## DEPENDENCE_between             0.08                0.02
## AGENCY_between                 0.36                0.01
## SUBMISSIVENESS_between         0.05                0.51
## COMMUNION_between              0.39                0.00
## DISCONNECTION_between          0.00                0.07
## WORD_COUNT_MEAN                0.38                0.00
## pre_mh                        0.00                0.17
## age                           0.03                0.51
## gender_f                      0.86                0.87
## gender_tgd                    0.34                0.09
## race_binary                   0.36                0.08
## education                     0.00                0.00
## employment_binary             0.00                0.76
##                INDEPENDENCE_between DEPENDENCE_between AGENCY_between
## PWB_RC_between                0.60                0.18                0.51
## INTERDEPENDENCE_between        0.76                0.07                0.05
## INDEPENDENCE_between           0.00                0.09                0.00
## DEPENDENCE_between             0.04                0.00                0.06
## AGENCY_between                 0.00                0.02                0.00
## SUBMISSIVENESS_between         0.00                0.00                0.00
## COMMUNION_between              0.53                0.01                0.13
## DISCONNECTION_between          0.01                0.00                0.02
## WORD_COUNT_MEAN                0.01                0.00                0.00
## pre_mh                        0.01                0.00                0.00
## age                           0.06                0.95                0.01
## gender_f                      0.48                0.27                0.26
## gender_tgd                    0.02                0.03                0.76
## race_binary                   0.10                0.25                0.29
## education                     0.19                0.57                0.00
## employment_binary             0.35                0.33                0.49
##                SUBMISSIVENESS_between COMMUNION_between
## PWB_RC_between                0.12                0.53
## INTERDEPENDENCE_between        0.64                0.00
## INDEPENDENCE_between           0.00                0.64
## DEPENDENCE_between             0.00                0.03
## AGENCY_between                 0.01                0.26
## SUBMISSIVENESS_between         0.00                0.65
## COMMUNION_between              0.54                0.00
## DISCONNECTION_between          0.00                0.03
## WORD_COUNT_MEAN                0.00                0.00
## pre_mh                        0.00                0.38
## age                           0.87                0.96
## gender_f                      0.32                0.18
## gender_tgd                    0.02                0.44

```

## race_binary	0.21	0.25		
## education	0.05	0.10		
## employment_binary	0.18	0.98		
##	DISCONNECTION_between	WORD_COUNT_MEAN	pre_mh	age
## PWB_RC_between	0.01	0.53	0.00	0.08
## INTERDEPENDENCE_between	0.16	0.00	0.31	0.63
## INDEPENDENCE_between	0.03	0.03	0.04	0.13
## DEPENDENCE_between	0.00	0.00	0.00	0.98
## AGENCY_between	0.07	0.00	0.01	0.04
## SUBMISSIVENESS_between	0.00	0.00	0.00	0.94
## COMMUNION_between	0.08	0.01	0.53	0.98
## DISCONNECTION_between	0.00	0.01	0.01	0.50
## WORD_COUNT_MEAN	0.00	0.00	0.00	0.98
## pre_mh	0.00	0.00	0.00	0.94
## age	0.34	0.96	0.88	0.00
## gender_f	0.11	0.41	0.34	0.97
## gender_tgd	0.04	0.03	0.00	0.45
## race_binary	0.01	0.18	0.59	0.46
## education	0.09	0.06	0.03	0.88
## employment_binary	0.29	0.34	0.00	0.02
##	gender_f	gender_tgd	race_binary	education
## PWB_RC_between	0.94	0.50	0.51	0.01
## INTERDEPENDENCE_between	0.94	0.19	0.18	0.02
## INDEPENDENCE_between	0.61	0.07	0.21	0.34
## DEPENDENCE_between	0.44	0.08	0.42	0.67
## AGENCY_between	0.44	0.86	0.46	0.02
## SUBMISSIVENESS_between	0.50	0.05	0.37	0.12
## COMMUNION_between	0.33	0.59	0.42	0.19
## DISCONNECTION_between	0.22	0.11	0.04	0.19
## WORD_COUNT_MEAN	0.55	0.09	0.33	0.13
## pre_mh	0.50	0.02	0.68	0.08
## age	0.98	0.59	0.60	0.94
## gender_f	0.00	0.00	0.96	0.08
## gender_tgd	0.00	0.00	0.50	0.67
## race_binary	0.92	0.33	0.00	0.65
## education	0.03	0.56	0.54	0.00
## employment_binary	0.88	0.16	0.86	0.04
##	employment_binary			
## PWB_RC_between	0.00			
## INTERDEPENDENCE_between	0.86			
## INDEPENDENCE_between	0.50			
## DEPENDENCE_between	0.50			
## AGENCY_between	0.62			
## SUBMISSIVENESS_between	0.33			
## COMMUNION_between	0.98			
## DISCONNECTION_between	0.46			
## WORD_COUNT_MEAN	0.50			
## pre_mh	0.02			
## age	0.05			
## gender_f	0.94			
## gender_tgd	0.30			
## race_binary	0.94			

```
## education 0.09
## employment_binary 0.00
##
## To see confidence intervals of the correlations, print with the short=FALSE option
```

Additionally, effect sizes are shown here (Cohen's d with 95% confidence intervals) for relationships between binary variables, PWB, and narrative variables.

```
for(v in c("gender_f", "gender_tgd", "race_binary", "employment_binary")){
  cat(paste0("\n\nGroup differences for ",v,"\n\n"))

  dc_long_strict %>%
    group_by(LinkingID) %>%
    slice(1) %>%
    ungroup() %>%
    select(all_of(v), PWB_RC, INTERDEPENDENCE_between:DISCONNECTION_between) %>%
      cohen.d(group = v, MD = F) %>%
    print()
}
```

```
##
##
##
## Group differences for gender_f
##
## Call: cohen.d(x = ., group = v, MD = F)
## Cohen d statistic of difference between two means
##           lower effect upper
## PWB_RC      -0.27   0.11  0.50
## INTERDEPENDENCE_between -0.35   0.03  0.42
## INDEPENDENCE_between  -0.53  -0.14  0.24
## DEPENDENCE_between    -0.17   0.22  0.61
## AGENCY_between       -0.16   0.22  0.61
## SUBMISSIVENESS_between -0.19   0.20  0.58
## COMMUNION_between     -0.12   0.27  0.65
## DISCONNECTION_between  -0.07   0.32  0.70
##
## Multivariate (Mahalanobis) distance between groups
## [1] NA
## r equivalent of difference between two means
##           PWB_RC INTERDEPENDENCE_between INDEPENDENCE_between
##           0.06                0.02                -0.07
## DEPENDENCE_between AGENCY_between SUBMISSIVENESS_between
##           0.11                0.11                0.10
## COMMUNION_between DISCONNECTION_between
##           0.13                0.15
##
##
##
## Group differences for gender_tgd
##
## Call: cohen.d(x = ., group = v, MD = F)
## Cohen d statistic of difference between two means
##           lower effect upper
## PWB_RC      -0.79  -0.32  0.15
## INTERDEPENDENCE_between -0.06   0.41  0.88
## INDEPENDENCE_between    0.08   0.56  1.03
## DEPENDENCE_between      0.05   0.53  1.00
## AGENCY_between       -0.40   0.07  0.54
## SUBMISSIVENESS_between  0.11   0.59  1.06
## COMMUNION_between     -0.28   0.19  0.66
## DISCONNECTION_between  0.02   0.49  0.96
##
## Multivariate (Mahalanobis) distance between groups
## [1] NA
## r equivalent of difference between two means
##           PWB_RC INTERDEPENDENCE_between INDEPENDENCE_between
##           -0.13                0.16                0.22
## DEPENDENCE_between AGENCY_between SUBMISSIVENESS_between
##           0.21                0.03                0.23
## COMMUNION_between DISCONNECTION_between
##           0.08                0.19
```

```
##
##
##
## Group differences for race_binary
##
## Call: cohen.d(x = ., group = v, MD = F)
## Cohen d statistic of difference between two means
##               lower effect upper
## PWB_RC         -0.30   0.28  0.86
## INTERDEPENDENCE_between -1.10 -0.52  0.06
## INDEPENDENCE_between   -0.09   0.49  1.07
## DEPENDENCE_between     -0.93 -0.35  0.23
## AGENCY_between        -0.90 -0.32  0.26
## SUBMISSIVENESS_between -0.96 -0.37  0.21
## COMMUNION_between     -0.93 -0.35  0.23
## DISCONNECTION_between  -1.38 -0.79 -0.20
##
## Multivariate (Mahalanobis) distance between groups
## [1] NA
## r equivalent of difference between two means
##               PWB_RC INTERDEPENDENCE_between INDEPENDENCE_between
##                0.09                -0.17                0.16
## DEPENDENCE_between          AGENCY_between SUBMISSIVENESS_between
##               -0.11                -0.10                -0.12
## COMMUNION_between DISCONNECTION_between
##               -0.11                -0.25
##
##
##
## Group differences for employment_binary
##
## Call: cohen.d(x = ., group = v, MD = F)
## Cohen d statistic of difference between two means
##               lower effect upper
## PWB_RC         0.52   0.96  1.40
## INTERDEPENDENCE_between -0.48 -0.07  0.35
## INDEPENDENCE_between   -0.62 -0.20  0.22
## DEPENDENCE_between     -0.63 -0.21  0.21
## AGENCY_between        -0.57 -0.15  0.27
## SUBMISSIVENESS_between -0.71 -0.29  0.13
## COMMUNION_between     -0.42 -0.01  0.41
## DISCONNECTION_between  -0.65 -0.23  0.19
##
## Multivariate (Mahalanobis) distance between groups
## [1] NA
## r equivalent of difference between two means
##               PWB_RC INTERDEPENDENCE_between INDEPENDENCE_between
##                0.40                -0.03                -0.09
## DEPENDENCE_between          AGENCY_between SUBMISSIVENESS_between
##               -0.09                -0.07                -0.13
## COMMUNION_between DISCONNECTION_between
##                0.00                -0.10
```

Table S3

Within-person relationships between study variables

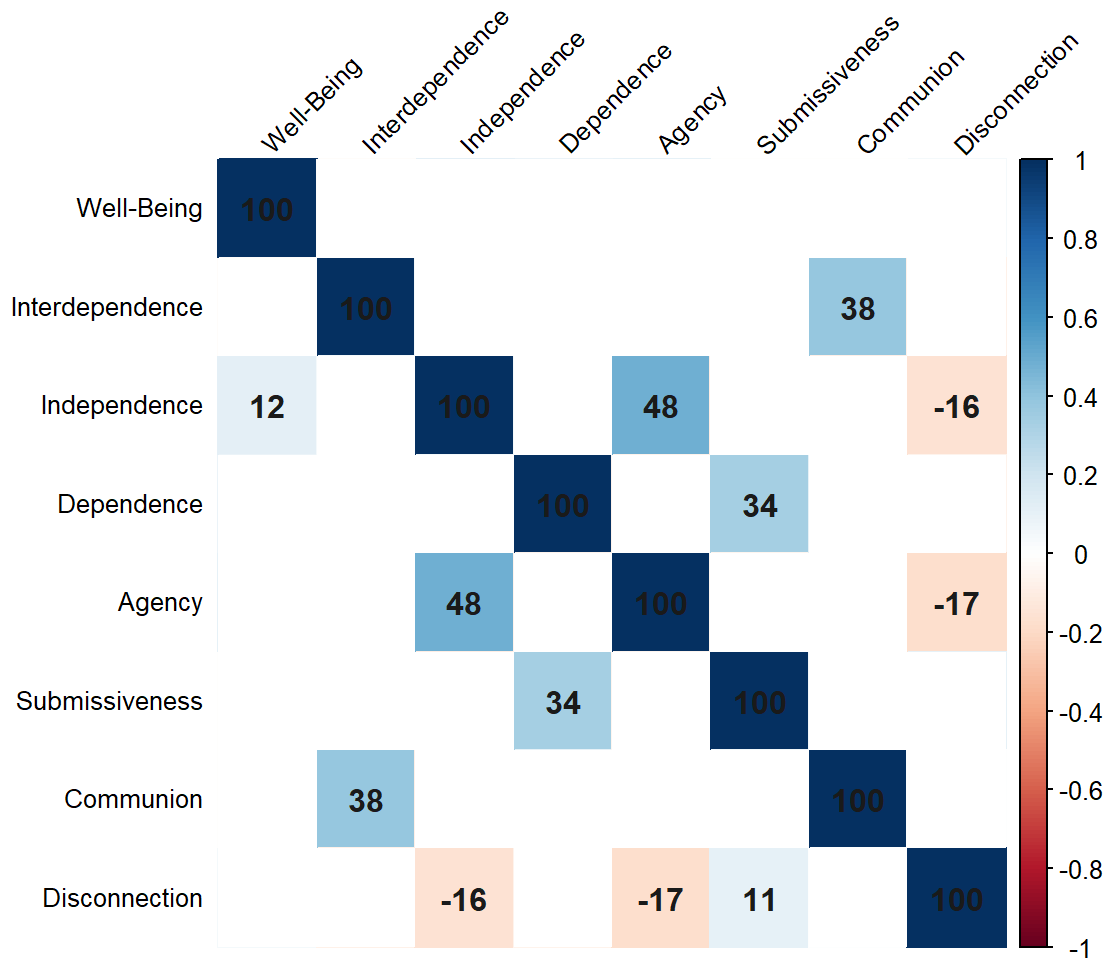
Within-person correlations are shown below. These are expressed as Pearson correlations for within-person variables (within-person variables are person-mean centered, i.e., contextual effects of yearly variation around one's personal mean). For within-person data, Pearson correlations estimate an average strength of within-person associations across the entire sample (i.e., not accounting for individual differences in the strength of within-person correlations) and assume that data have a simple structure. If desired, it is also possible to specify each relationship in a separate multilevel model to obtain more precise estimates.

```
cors_within <- dc_long_strict %>%
  select(PWB_RC_within, INTERDEPENDENCE_within:DISCONNECTION_within) %>%
  corr.test(adjust = "fdr")

colnames(cors_within$r) <- c("Well-Being", "Interdependence", "Independence", "Dependence",
                             "Agency", "Submissiveness", "Communion", "Disconnection")
rownames(cors_within$r) <- c("Well-Being", "Interdependence", "Independence", "Dependence",
                             "Agency", "Submissiveness", "Communion", "Disconnection")

corrplot::corrplot(cors_within$r, p.mat = cors_within$p, method = "color", insig = "blank",
                    addCoef.col = "grey10", addCoefasPercent = T, number.cex = 1,
                    tl.cex = .8, tl.srt = 45, tl.col = "black")
```

```
## Warning in corrplot::corrplot(cors_within$r, p.mat = cors_within$p, method =
## "color", : p.mat and corr may be not paired, their rownames and colnames are
## not totally same!
```



cors_within

```
## Call:corr.test(x = ., adjust = "fdr")
## Correlation matrix
##
```

	Well-Being	Interdependence	Independence	Dependence	Agency
## Well-Being	1.00	-0.02	0.12	0.08	0.11
## Interdependence	-0.02	1.00	0.04	0.02	0.09
## Independence	0.12	0.04	1.00	0.04	0.48
## Dependence	0.08	0.02	0.04	1.00	-0.07
## Agency	0.11	0.09	0.48	-0.07	1.00

```
## Submissiveness
## Communion
## Disconnection
##
```

	Submissiveness	Communion	Disconnection
## Well-Being	-0.01	-0.01	0.05
## Interdependence	0.02	0.38	-0.08
## Independence	-0.09	-0.09	-0.16
## Dependence	0.34	0.10	-0.07
## Agency	-0.06	-0.03	-0.17
## Submissiveness	1.00	0.06	0.11
## Communion	0.06	1.00	0.01
## Disconnection	0.11	0.01	1.00

```
## Sample Size
## [1] 324
## Probability values (Entries above the diagonal are adjusted for multiple tests.)
##
```

	PWB_RC_within	INTERDEPENDENCE_within	INDEPENDENCE_within
## PWB_RC_within	0.00	0.85	0.16
## INTERDEPENDENCE_within	0.73	0.00	0.58
## INDEPENDENCE_within	0.03	0.44	0.00
## DEPENDENCE_within	0.14	0.76	0.44
## AGENCY_within	0.06	0.09	0.00
## SUBMISSIVENESS_within	0.92	0.76	0.10
## COMMUNION_within	0.88	0.00	0.11
## DISCONNECTION_within	0.42	0.16	0.00

```
##
```

	DEPENDENCE_within	AGENCY_within	SUBMISSIVENESS_within
## PWB_RC_within	0.31	0.20	0.92
## INTERDEPENDENCE_within	0.85	0.25	0.85
## INDEPENDENCE_within	0.58	0.00	0.25
## DEPENDENCE_within	0.00	0.41	0.00
## AGENCY_within	0.22	0.00	0.48
## SUBMISSIVENESS_within	0.00	0.31	0.00
## COMMUNION_within	0.06	0.58	0.30
## DISCONNECTION_within	0.23	0.00	0.05

```
##
```

	COMMUNION_within	DISCONNECTION_within
## PWB_RC_within	0.92	0.58
## INTERDEPENDENCE_within	0.00	0.33
## INDEPENDENCE_within	0.26	0.03
## DEPENDENCE_within	0.20	0.41
## AGENCY_within	0.74	0.01
## SUBMISSIVENESS_within	0.48	0.20
## COMMUNION_within	0.00	0.92
## DISCONNECTION_within	0.92	0.00

##

To see confidence intervals of the correlations, print with the short=FALSE option

ICCs

Is there sufficient within-person variance in well-being for multilevel models to be appropriate and informative? We test this by checking the ICC from a random intercept model with well-being as the dependent variable:

```
empty_wb <- lmer(PWB_RC ~ 1 + (1|LinkingID), dc_long_strict)
tab_model(empty_wb)
```

PWB RC			
<i>Predictors</i>	<i>Estimates</i>	<i>CI</i>	<i>p</i>
(Intercept)	0.04	-0.09 – 0.18	0.519
Random Effects			
σ^2	0.15		
τ_{00} LinkingID	0.44		
ICC	0.75		
$N_{\text{LinkingID}}$	108		
Observations	324		
Marginal R^2 / Conditional R^2 0.000 / 0.751			

The ICC is .75, indicating a meaningful amount of within-person clustering (conventionally, ICC >.05 requires multilevel modeling).

Figure S1

Change in Well-Being Over Time

Next, we want to test whether there is meaningful change over time in well-being in our sample. First we can plot each individual's change in well-being, with the overall trend overlaid on top of the individual participants' well-being data:

```

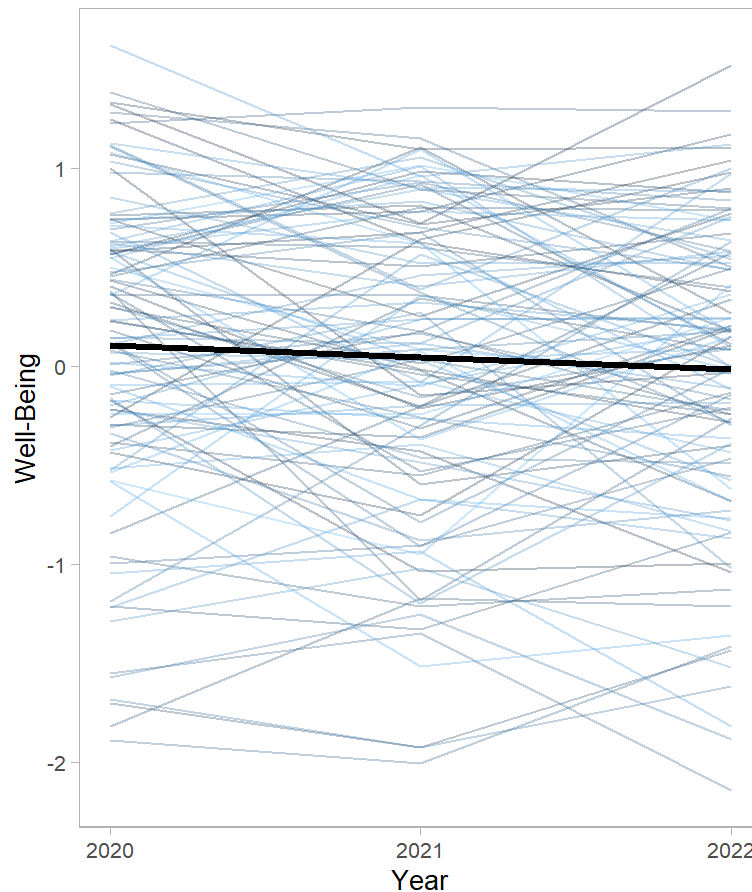
time_wb <- lmer(PWB_RC ~ time_cent + (time_cent|LinkingID), dc_long_strict)

time_effect <- Effect("time_cent", mod=time_wb) %>%
  as.data.frame()

time_plot <- ggplot(dc_long_strict, aes(x = time_cent + 2020, y = PWB_RC, color = LinkingID, group = LinkingID)) +
  geom_line(alpha = .3) +
  labs(title="Well-Being During COVID",
       y = "Well-Being",
       x = "Year") +
  theme_light() +
  scale_x_continuous(breaks = c(2020, 2021, 2022)) +
  theme(text=element_text(size=10), aspect.ratio=1.2, panel.grid = element_blank(),
        legend.position = "none") +
  geom_segment(x = 2020, xend = 2022,
              y = time_effect$fit[[1]], yend = time_effect$fit[[5]],
              linewidth=1.2, color = "black")
time_plot

```

Well-Being During COVID



Model S1

Change over time in well-being

Now we test whether the trend is significant. We test this in a multilevel model with fixed and random effects for time (centered on 2020, the beginning of the study) predicting well-being.

```
tab_model(time_wb, show.re.var = T)
```

<i>Predictors</i>	PWB RC		
	<i>Estimates</i>	<i>CI</i>	<i>p</i>
(Intercept)	0.10	-0.04 – 0.25	0.157
time cent	-0.06	-0.11 – -0.01	0.025

Random Effects

σ^2	0.13
T00 LinkingID	0.48
T11 LinkingID.time_cent	0.02
P01 LinkingID	-0.30
ICC	0.78
N LinkingID	108
Observations	324
Marginal R ² / Conditional R ²	0.004 / 0.784

```
emmeans(time_wb, "time_cent",
  at = list(time_cent = c(0, 1, 2)))
```

```
## time_cent emmean SE df lower.CL upper.CL
##          0  0.1046 0.0737 107  -0.0416  0.251
##          1  0.0434 0.0671 107  -0.0897  0.176
##          2 -0.0178 0.0711 107  -0.1587  0.123
##
## Degrees-of-freedom method: kenward-roger
## Confidence level used: 0.95
```

We see that the effect of time is significant. Overall, the sample reported declining well-being from 2020 to 2022.

Supplemental S6

Trends in Narrative Identity Variables Over Time

As a final descriptive analysis, we examine whether any of the narrative identity themes increased or decreased in prevalence from 2020 to 2022. For significant effects, we also extract marginal means predicting the level of the narrative identity theme in each year of the study (0 = 2020; 1 = 2021; 2 = 2022).

```
time_inter <- lmer(INTERDEPENDENCE ~ time_cent + (1 | LinkingID), dc_long_strict)
tab_model(time_inter, show.intercept = F, show.se = T)
```

INTERDEPENDENCE				
Predictors	Estimates	std. Error	CI	p
time cent	-0.01	0.01	-0.03 – 0.01	0.364
Random Effects				
σ^2	0.03			
τ_{00} LinkingID	0.00			
ICC	0.08			
N _{LinkingID}	108			
Observations	324			
Marginal R ² / Conditional R ²	0.002 / 0.084			

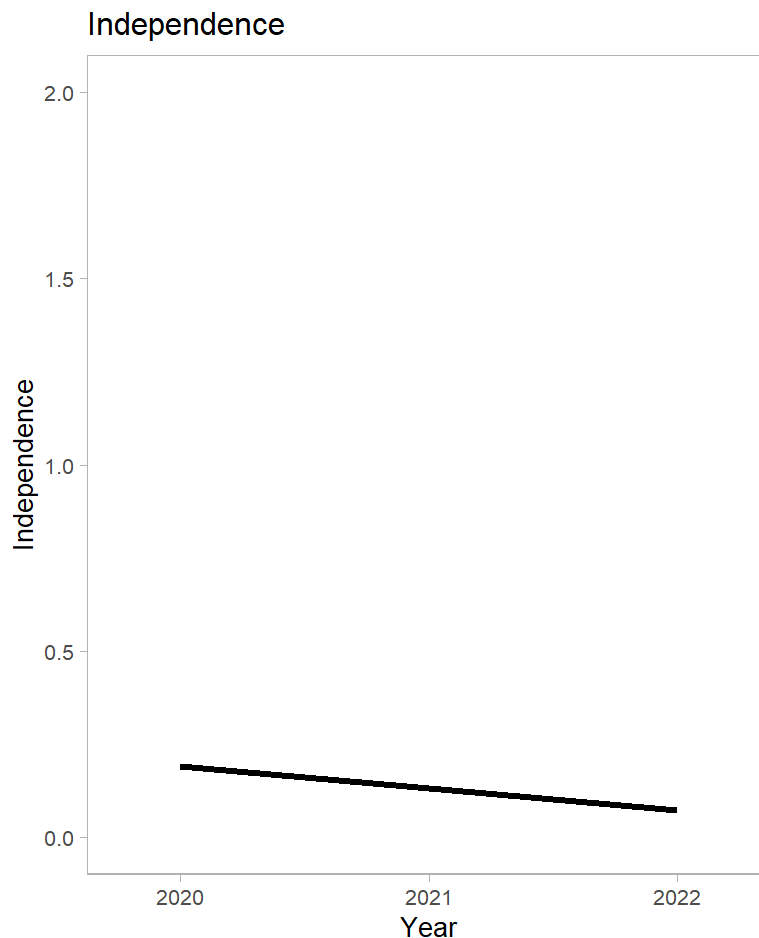
```
time_ind <- lmer(INDEPENDENCE ~ time_cent + (1 | LinkingID), dc_long_strict)
tab_model(time_ind, show.intercept = F, show.se = T)
```

INDEPENDENCE				
Predictors	Estimates	std. Error	CI	p
time cent	-0.06	0.02	-0.09 – -0.03	<0.001
Random Effects				
σ^2	0.05			
τ_{00} LinkingID	0.01			
ICC	0.17			
N _{LinkingID}	108			
Observations	324			
Marginal R ² / Conditional R ²	0.035 / 0.197			

```
emmeans(time_ind, "time_cent",
         at = list(time_cent = c(0, 1, 2)))
```

```
## time_cent emmean SE df lower.CL upper.CL
##      0 0.1911 0.0226 279 0.1465 0.236
##      1 0.1317 0.0163 107 0.0994 0.164
##      2 0.0723 0.0226 279 0.0277 0.117
##
## Degrees-of-freedom method: kenward-roger
## Confidence level used: 0.95
```

```
plot_ind <- change_plot(time_ind, "Independence")
plot_ind
```



```
time_dep <- lmer(DEPENDENCE ~ time_cent + (1 | LinkingID), dc_long_strict)
tab_model(time_dep, show.intercept = F, show.se = T)
```

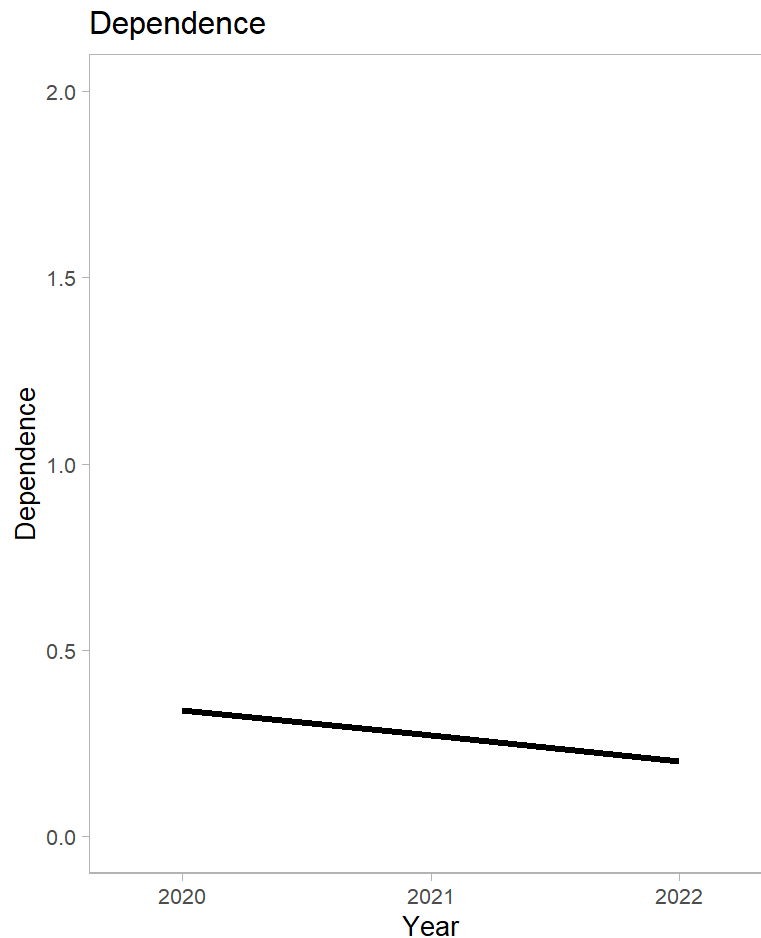
DEPENDENCE				
Predictors	Estimates	std. Error	CI	p
time cent	-0.07	0.03	-0.12 – -0.02	0.007
Random Effects				
σ^2	0.14			
T00 LinkingID	0.02			

```
ICC                                0.15
N_LinkingID                        108
Observations                       324
Marginal R2 / Conditional R2 0.019 / 0.164
```

```
emmeans(time_dep, "time_cent",
         at = list(time_cent = c(0, 1, 2)))
```

```
## time_cent emmean      SE df lower.CL upper.CL
##          0  0.340 0.0356 285    0.270    0.410
##          1  0.271 0.0252 107    0.221    0.321
##          2  0.202 0.0356 285    0.132    0.272
##
## Degrees-of-freedom method: kenward-roger
## Confidence level used: 0.95
```

```
plot_dep <- change_plot(time_dep, "Dependence")
plot_dep
```



```
time_hi_agn <- lmer(AGENCY ~ time_cent + (1 | LinkingID), dc_long_strict)
tab_model(time_hi_agn, show.intercept = F, show.se = T)
```

AGENCY

<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	-0.04	0.02	-0.08 – -0.00	0.049

Random Effects

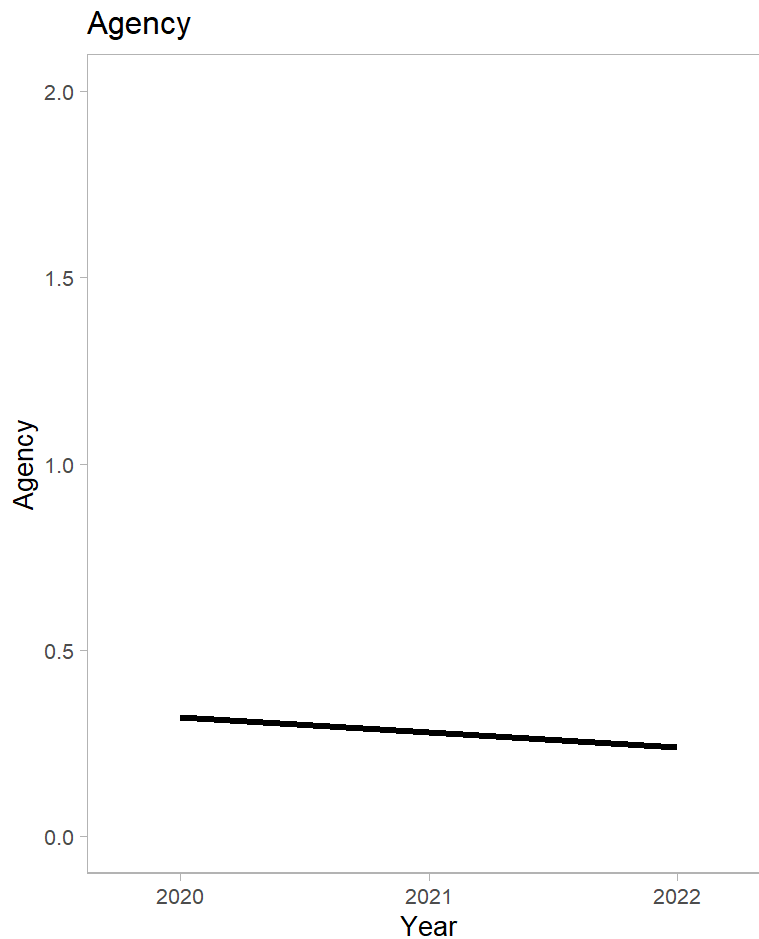
σ^2	0.09
T00 LinkingID	0.04
ICC	0.31
N _{LinkingID}	108
Observations	324

Marginal R² / Conditional R² 0.008 / 0.315

```
emmeans(time_hi_agn, "time_cent",
  at = list(time_cent = c(0, 1, 2)))
```

```
## time_cent emmean SE df lower.CL upper.CL
## 0 0.321 0.0332 239 0.255 0.386
## 1 0.280 0.0259 107 0.229 0.331
## 2 0.239 0.0332 239 0.174 0.304
##
## Degrees-of-freedom method: kenward-roger
## Confidence level used: 0.95
```

```
plot_agn <- change_plot(time_hi_agn, "Agency")
plot_agn
```



```
time_lo_agn <- lmer(SUBMISSIVENESS ~ time_cent + (1 | LinkingID), dc_long_strict)
tab_model(time_lo_agn, show.intercept = F, show.se = T)
```

SUBMISSIVENESS

Predictors	Estimates	std. Error	CI	p
time cent	-0.02	0.03	-0.07 – 0.03	0.391

Random Effects

σ^2	0.14
T00 LinkingID	0.06
ICC	0.30
N LinkingID	108
Observations	324
Marginal R ² / Conditional R ²	0.002 / 0.299

```
time_hi_com <- lmer(COMMUNION ~ time_cent + (1 | LinkingID), dc_long_strict)
tab_model(time_hi_com, show.intercept = F, show.se = T)
```

COMMUNION

Predictors	Estimates	std. Error	CI	p
------------	-----------	------------	----	---

time cent	-0.01	0.02	-0.05 – 0.03	0.631
-----------	-------	------	--------------	-------

Random Effects

σ^2	0.11
------------	------

T ₀₀ LinkingID	0.04
---------------------------	------

ICC	0.27
-----	------

N _{LinkingID}	108
------------------------	-----

Observations	324
--------------	-----

Marginal R ² / Conditional R ²	0.001 / 0.266
--	---------------

```
time_lo_com <- lmer(DISCONNECTION ~ time_cent + (1 | LinkingID), dc_long_strict)
tab_model(time_lo_com, show.intercept = F, show.se = T)
```

DISCONNECTION

<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	0.16	0.02	0.11 – 0.20	<0.001

Random Effects

σ^2	0.11
------------	------

T ₀₀ LinkingID	0.05
---------------------------	------

ICC	0.33
-----	------

N _{LinkingID}	108
------------------------	-----

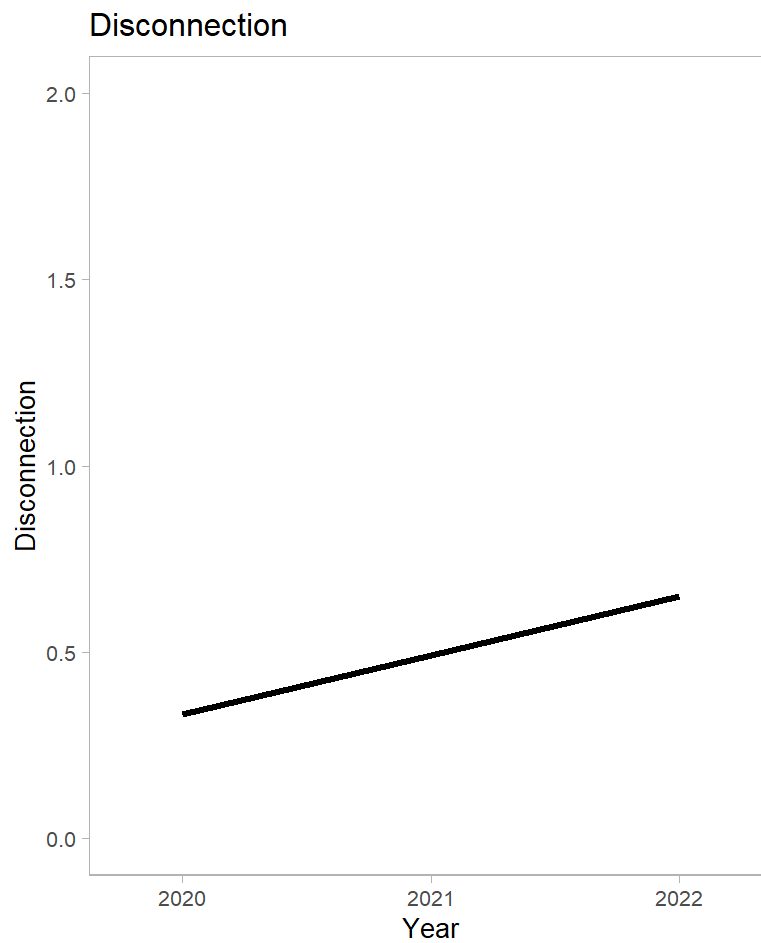
Observations	324
--------------	-----

Marginal R ² / Conditional R ²	0.093 / 0.392
--	---------------

```
emmeans(time_lo_com, "time_cent",
  at = list(time_cent = c(0, 1, 2)))
```

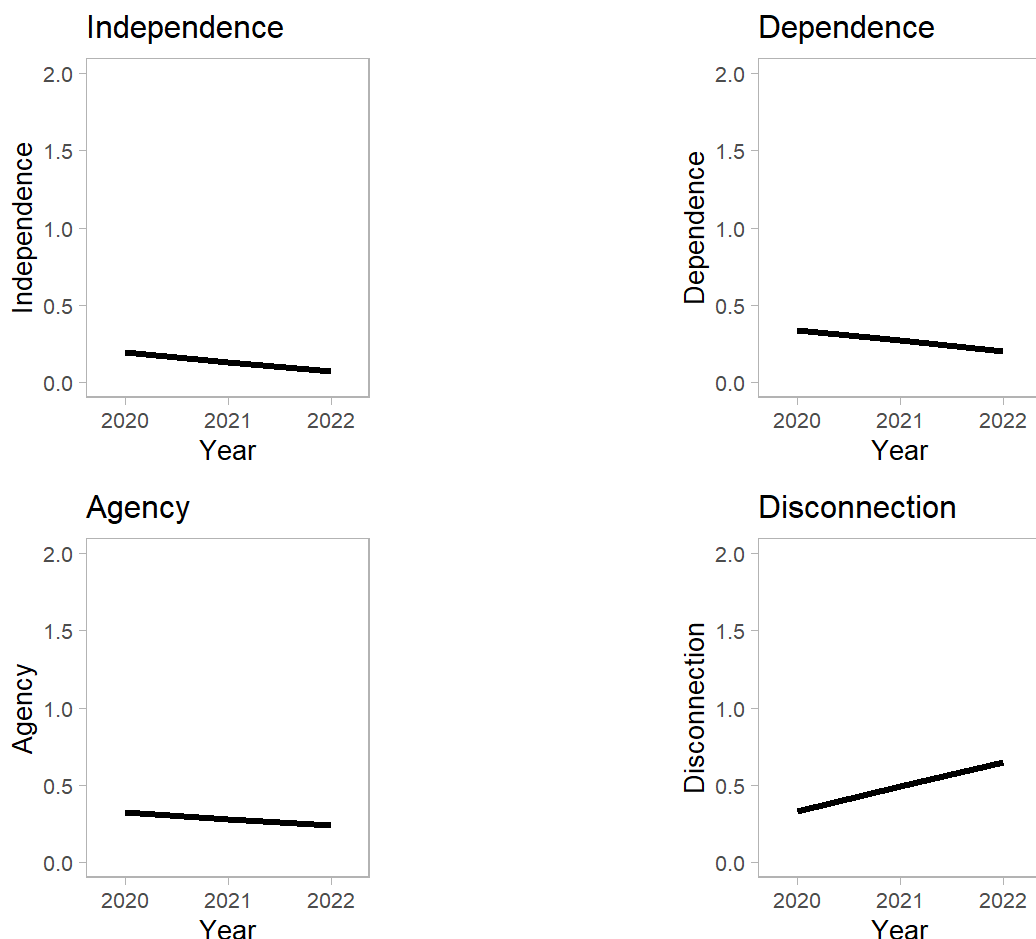
```
## time_cent emmean SE df lower.CL upper.CL
##      0  0.333 0.0367 233  0.260  0.405
##      1  0.491 0.0290 107  0.433  0.548
##      2  0.649 0.0367 233  0.577  0.721
##
## Degrees-of-freedom method: kenward-roger
## Confidence level used: 0.95
```

```
plot_dis <- change_plot(time_lo_com, "Disconnection")
plot_dis
```



Combining the findings above, there is a single plot of all the narrative identity variables changing over time.

```
grid.arrange(plot_ind, plot_dep, plot_agi, plot_dis, nrow = 2)
```



Moderation by Narrative Identity

The main study questions are exploratory, testing whether various narrative identity themes moderated changes in well-being during the COVID pandemic. The primary theme of interest was interdependence. Secondary themes of interest were independence, dependence, agency, constraint (i.e., low agency), communion, and disconnection (i.e., low communion).

(Note: I've duplicated some interpretive text for a few different models where relevant, so that the interpretation of each model should hopefully stand on its own).

Model S1

Primary Analysis: Interdependence

We test interdependence in a multilevel model with fixed and random effects for time (centered on 2020), fixed effects for between- and within-person components of interdependence, and interactions between time and both components of interdependence. The between-person component is each person's mean level of interdependence. The within-person component is person-mean-centered interdependence (i.e., a person's observed interdependence in a particular year, minus that person's mean level of interdependence), capturing the extent to which they expressed more or less interdependence that year than is typical for them.

```
inter_wb <- dc_lmer("PWB_RC", "INTERDEPENDENCE", dc_long_strict)
tab_model(inter_wb, show.intercept = F, show.se = T)
```

PWB RC				
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	-0.06	0.03	-0.11 – -0.00	0.036
INTERDEPENDENCE between sqrt cent	-0.14	0.66	-1.43 – 1.15	0.835
INTERDEPENDENCE within	-0.62	0.30	-1.22 – -0.03	0.041
time cent × INTERDEPENDENCE between sqrt cent	0.25	0.24	-0.23 – 0.72	0.311
time cent × INTERDEPENDENCE within	0.54	0.24	0.06 – 1.02	0.026

Random Effects

σ^2	0.12
T00 LinkingID	0.49
T11 LinkingID.time_cent	0.02
P01 LinkingID	-0.27
ICC	0.79
N _{LinkingID}	108
Observations	324
Marginal R ² / Conditional R ²	0.011 / 0.796

We see a significant main effect and a significant interaction for within-person interdependence. The main effect indicates that people tended to experience worse well-being in years when they narrated with more interdependence than is typical for them.

The interaction will be a bit easier to interpret if we plot it out. There were no significant effects for interdependence at the between-person level, so let's only plot the within-person level to keep the figure neater.

Figure S2

```

inter_wb_dup <- lmer(PWB_RC ~ time_cent * INTERDEPENDENCE_within + time_cent * INTERDEPENDENCE_b
etween_cent + (time_cent|LinkingID), dc_long_strict) #Calculate duplicate model so Effect can re
ad the formula

inter_eff <- Effect(c("INTERDEPENDENCE_within", "time_cent"), inter_wb_dup,
                    xlevels = list(INTERDEPENDENCE_within = c(-.14, .14),
                                   time_cent = c(0, 1, 2))) %>%

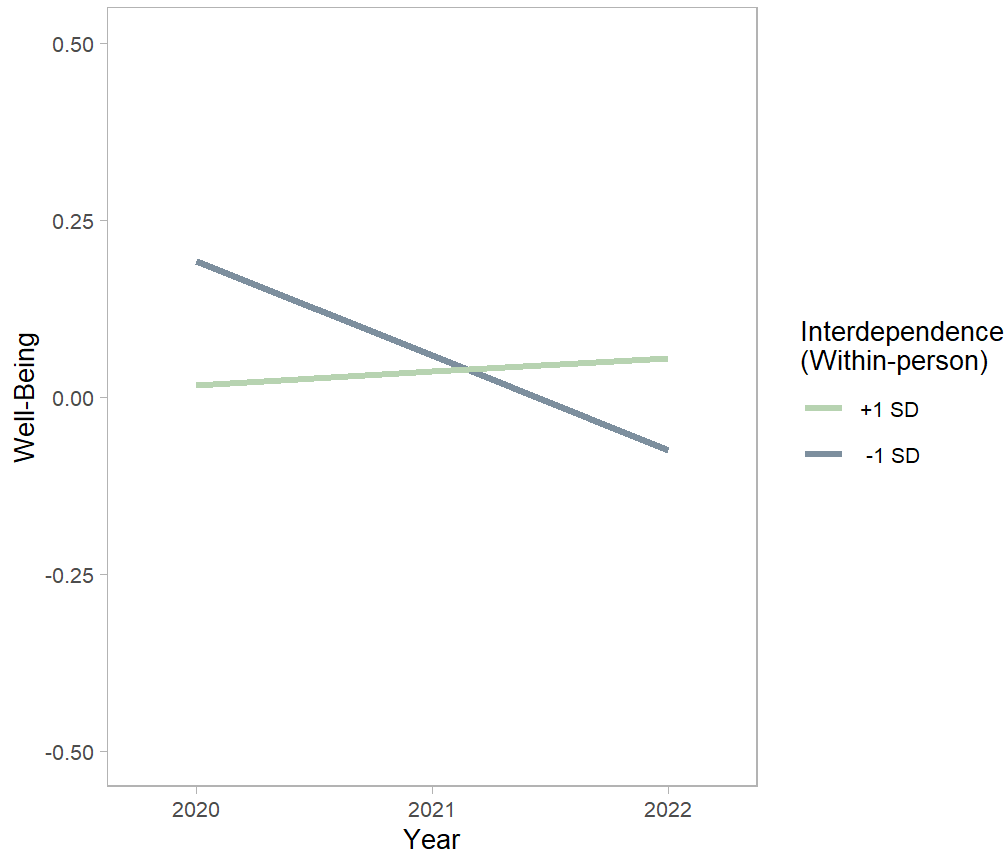
as.data.frame() %>%
mutate(Year = time_cent + 2020,
       int_within = factor(INTERDEPENDENCE_within, labels = c(" -1 SD", "+1 SD")))

inter_plot <- ggplot(inter_eff, aes(x = Year, y = fit, color = int_within)) +
  geom_line(linewidth=1.2) +
  labs(title="A. Well-Being",
       subtitle="As a function of Interdependence",
       y = "Well-Being",
       x = "Year",
       color = "Interdependence\n(Within-person)") +
  guides(fill="none",
         color = guide_legend(order = 1, reverse = TRUE)) +
  theme_light() +
  theme(text=element_text(size=10), aspect.ratio=1.2, panel.grid = element_blank(),
        #       legend.position = c(0.25, 0.85)
        legend.position = "right"
  ) +
  scale_colour_manual(values = c("#7d8f9e", "#b7d3b1")) +
  scale_x_continuous(breaks = c(2020, 2021, 2022)) +
  coord_cartesian(xlim = c(2019.75, 2022.25),
                  ylim = c(-.5, .5))
inter_plot

```

A. Well-Being

As a function of Interdependence



From year to year, individuals fluctuate in the extent to which they narrate their life stories with themes of interdependence. The effect of these within-person fluctuations on well-being evolved over the study period: as the study progressed, fluctuations below one's personal mean on interdependence were associated with increasingly poor levels of well-being.

We can probe this further with a simple slopes analysis. Simple slopes were evaluated at the mean and +/- 1 SD.

```
simple_slopes(inter_wb_dup)
```

```
##   time_cent INTERDEPENDENCE_within Test Estimate Std. Error      df t value
## 1   0.18224          sstest      -0.5233    0.2652 223.6780 -1.9730
## 2       1          sstest      -0.0799    0.1489 210.4530 -0.5365
## 3   1.81776          sstest      0.3635    0.2301 218.9382  1.5802
## 4          sstest      -0.142865    -0.1345    0.0424 213.0119 -3.1709
## 5          sstest           0      -0.0571    0.0271 106.6321 -2.1043
## 6          sstest      0.142865      0.0204    0.0456 223.1153  0.4475
##   Pr(>|t|) Sig.
## 1 0.049731  *
## 2 0.592197
## 3 0.115513
## 4 0.001744  **
## 5 0.037702  *
## 6 0.654949
```

Simple slopes analysis can be interpreted for either time or within-person interdependence. In our case, because we believe interdependence is the moderator, we are most interested in the simple slopes of time in rows 4-6. Simple slopes for time (rows 4-6) indicate that low and mean levels of within-person interdependence were associated with increasingly poor well-being from 2020 to 2022.

Model S2A

Secondary Analyses: Other Narrative Identity Variables

As exploratory analyses, the effects of six other narrative identity variables were tested.

Disconnection

Of the six other narrative identity themes, only one (disconnection, i.e., negative/thwarted communion) moderated change over time in well-being:

```
lo_com_wb <- dc_lmer("PWB_RC", "DISCONNECTION", dc_long_strict)
tab_model(lo_com_wb, show.intercept = F, show.se = T)
```

PWB RC				
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	-0.10	0.03	-0.16 – -0.04	0.001
DISCONNECTION between cent	-0.76	0.24	-1.22 – -0.30	0.001
DISCONNECTION within	-0.20	0.15	-0.49 – 0.09	0.178
time cent × DISCONNECTION between cent	0.03	0.09	-0.15 – 0.21	0.764
time cent × DISCONNECTION within	0.33	0.11	0.11 – 0.56	0.004

Random Effects

σ^2	0.12
T00 LinkingID	0.43
T11 LinkingID.time_cent	0.02
P01 LinkingID	-0.25
ICC	0.78
N _{LinkingID}	108
Observations	324
Marginal R ² / Conditional R ²	0.092 / 0.803

```
emmeans(lo_com_wb, "DISCONNECTION_between_cent",
        at = list(DISCONNECTION_between_cent = c(-.30, 0, .30)))
```

```
## NOTE: Results may be misleading due to involvement in interactions
```

```
## DISCONNECTION_between_cent    emmean      SE   df lower.CL upper.CL
##                               -0.3  0.22761 0.0914  108   0.0463   0.4089
##                               0.0  0.00847 0.0655  113  -0.1212   0.1382
##                               0.3 -0.21066 0.0923  111  -0.3936  -0.0277
##
## Degrees-of-freedom method: kenward-roger
## Confidence level used: 0.95
```

From year to year, individuals tend to narrate their life stories with a characteristic level of disconnection. Throughout the study period, individuals who tended to narrate with higher levels of disconnection tended to experience poorer well-being (i.e., significant main effect of between-person disconnection). Estimated marginal means quantify this effect. When holding all other effects constant (fixed effects for time, within-person disconnection, and interactions, as well as random effect for participant ID), a participant 1 SD above the mean on disconnection is expected to score -0.21 (0.27 SD below the mean) on well-being. A participant 1 SD above the mean on disconnection is expected to score 0.23 (0.30 SD above the mean) on well-being.

Disconnection also interacts with time to predict well-being. Again, let's plot this out to see the shape of the interaction. Interpretation: from year to year, individuals fluctuate in the extent to which they narrate their life stories with themes of disconnection. The effect of these within-person fluctuations on well-being evolved over the study period: as the study progressed, fluctuations below one's personal mean on disconnection were associated with increasingly poor levels of well-being.

```

com_wb_dup <- lmer(PWB_RC ~ time_cent * DISCONNECTION_within + time_cent * DISCONNECTION_between
_cent + (time_cent|LinkingID),
                  dc_long_strict) #Calculate duplicate model so Effect can read the formula

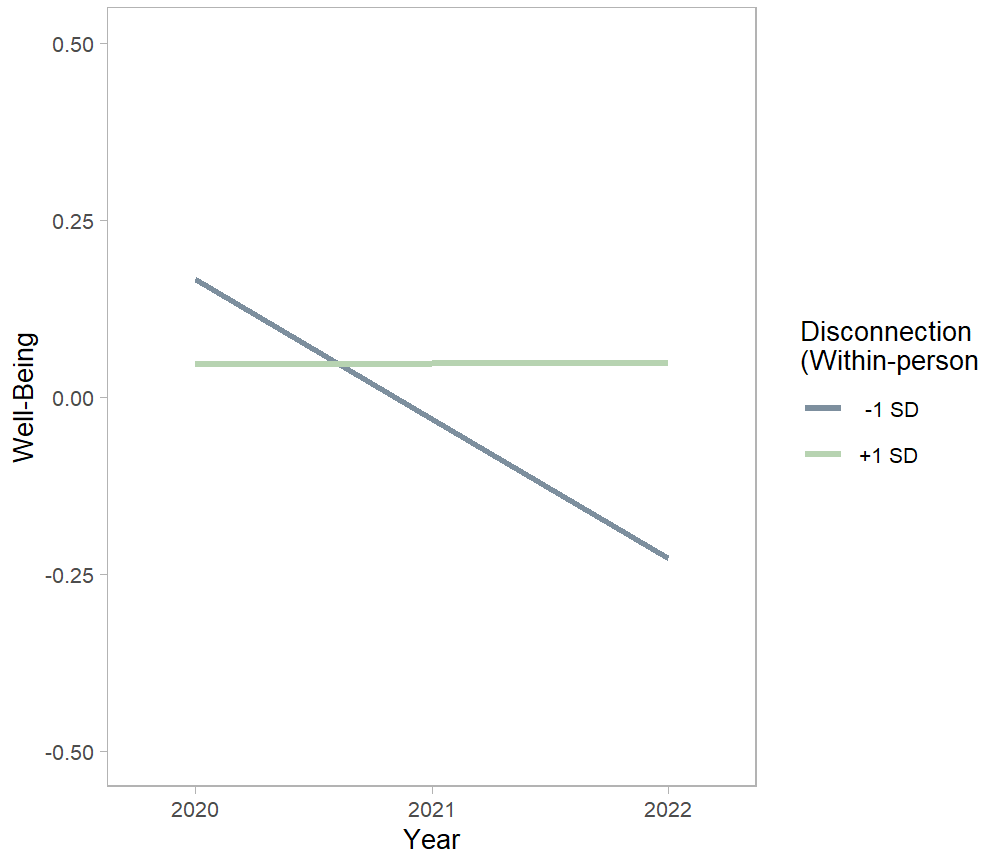
com_eff <- Effect(c("DISCONNECTION_within", "time_cent"), com_wb_dup, xlevels = list(
  DISCONNECTION_within = c(-.3, .3),
  time_cent = c(0, 1, 2))) %>%
as.data.frame() %>%
mutate(Year = time_cent + 2020,
       com_within = factor(DISCONNECTION_within, labels = c(" -1 SD", "+1 SD")))

com_plot <- ggplot(com_eff, aes(x = Year, y = fit, color = com_within)) +
  geom_line(linewidth=1.2) +
  labs(title="B. Well-Being",
       subtitle="As a function of Disconnection",
       y = "Well-Being",
       x = "Year",
       color = "Disconnection\n(Within-person)" +
  guides(fill="none",
         linetype = guide_legend(order = 1, reverse = TRUE)) +
  theme_light() +
  theme(text=element_text(size=10), aspect.ratio=1.2, panel.grid = element_blank(),
        #       legend.position = c(0.25, 0.85)
        legend.position = "right"
  ) +
  scale_colour_manual(values = c("#7d8f9e", "#b7d3b1")) +
  scale_x_continuous(breaks = c(2020, 2021, 2022)) +
  coord_cartesian(xlim = c(2019.75, 2022.25),
                 ylim = c(-.5, .5))
com_plot

```

B. Well-Being

As a function of Disconnection



We can probe this further with a simple slopes analysis. Simple slopes were evaluated at the mean and +/- 1 SD.

```
simple_slopes(com_wb_dup)
```

```
##   time_cent DISCONNECTION_within Test Estimate Std. Error      df t value
## 1   0.18224          sstest      -0.1399    0.1311 216.9409 -1.0673
## 2     1          sstest       0.1309    0.0779 210.9317  1.6803
## 3   1.81776          sstest       0.4017    0.1109 198.3837  3.6211
## 4          sstest      -0.29983    -0.1973    0.0478 235.3504 -4.1287
## 5          sstest           0     -0.0980    0.0297 125.8271 -3.3014
## 6          sstest       0.29983     0.0013    0.0426 215.4335  0.0297
##   Pr(>|t|) Sig.
## 1 0.2870385
## 2 0.0943719 .
## 3 0.0003725 ***
## 4 5.069e-05 ***
## 5 0.0012522 **
## 6 0.9763462
```

Simple slopes analysis can be interpreted for either time or within-person disconnection. In our case, because we believe disconnection is the moderator, we are most interested in the simple slopes of time in rows 4-6. These indicate that low and mean levels of within-person disconnection were associated with increasingly poor well-being from 2020 to 2022.

Overall, the within-person interaction is tricky to interpret and seems to be of smaller magnitude and relevance than the between-person main effect.

Models S2B to S2F

Other Narrative Variables

None of the other narrative identity variables (independence, dependence, agency, constraint, or communion) moderated change in well-being over time:

```
indep_wb <- dc_lmer("PWB_RC", "INDEPENDENCE", dc_long_strict)
depen_wb <- dc_lmer("PWB_RC", "DEPENDENCE", dc_long_strict)
hi_agn_wb <- dc_lmer("PWB_RC", "AGENCY", dc_long_strict)
lo_agn_wb <- dc_lmer("PWB_RC", "SUBMISSIVENESS", dc_long_strict)
hi_com_wb <- dc_lmer("PWB_RC", "COMMUNION", dc_long_strict)

tab_model(indep_wb, show.intercept = F, show.se = T)
```

PWB RC				
Predictors	Estimates	std. Error	CI	p
time cent	-0.06	0.03	-0.11 – -0.00	0.050
INDEPENDENCE between sqrt cent	-0.23	0.44	-1.10 – 0.64	0.602
INDEPENDENCE within	0.22	0.21	-0.20 – 0.64	0.299
time cent × INDEPENDENCE between sqrt cent	-0.09	0.17	-0.42 – 0.24	0.587
time cent × INDEPENDENCE within	-0.10	0.18	-0.46 – 0.25	0.566

Random Effects

σ^2	0.13
T ₀₀ LinkingID	0.48
T ₁₁ LinkingID.time_cent	0.02
P ₀₁ LinkingID	-0.30
ICC	0.78
N _{LinkingID}	108
Observations	324
Marginal R ² / Conditional R ²	0.010 / 0.784

```
tab_model(depen_wb, show.intercept = F, show.se = T)
```

PWB RC

<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	-0.05	0.03	-0.10 – 0.01	0.088
DEPENDENCE between sqrt cent	-0.39	0.28	-0.95 – 0.16	0.165
DEPENDENCE within	-0.19	0.14	-0.47 – 0.09	0.189
time cent × DEPENDENCE between sqrt cent	-0.01	0.11	-0.22 – 0.20	0.932
time cent × DEPENDENCE within	0.23	0.12	-0.01 – 0.47	0.057

Random Effects

σ^2	0.13
T00 LinkingID	0.48
T11 LinkingID.time_cent	0.01
P01 LinkingID	-0.35
ICC	0.78
N _{LinkingID}	108
Observations	324
Marginal R ² / Conditional R ²	0.033 / 0.784

```
tab_model(hi_agn_wb, show.intercept = F, show.se = T)
```

PWB RC

<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	-0.06	0.03	-0.11 – -0.00	0.044
AGENCY between sqrt cent	0.19	0.28	-0.36 – 0.73	0.499
AGENCY within	0.23	0.16	-0.09 – 0.54	0.162
time cent × AGENCY between sqrt cent	0.04	0.10	-0.17 – 0.24	0.726
time cent × AGENCY within	-0.11	0.14	-0.39 – 0.17	0.432

Random Effects

σ^2	0.12
T00 LinkingID	0.49
T11 LinkingID.time_cent	0.02

ρ_{01} LinkingID	-0.32
ICC	0.79
$N_{\text{LinkingID}}$	108
Observations	324
Marginal R^2 / Conditional R^2	0.013 / 0.789

```
tab_model(lo_agn_wb, show.intercept = F, show.se = T)
```

PWB RC				
Predictors	Estimates	std. Error	CI	p
time cent	-0.06	0.03	-0.12 – -0.01	0.024
SUBMISSIVENESS between cent	-0.40	0.23	-0.85 – 0.05	0.081
SUBMISSIVENESS within	-0.09	0.13	-0.36 – 0.17	0.479
time cent × SUBMISSIVENESS between cent	-0.01	0.09	-0.18 – 0.16	0.922
time cent × SUBMISSIVENESS within	0.08	0.11	-0.14 – 0.31	0.475

Random Effects

σ^2	0.13
T_{00} LinkingID	0.48
T_{11} LinkingID.time_cent	0.02
ρ_{01} LinkingID	-0.33
ICC	0.78
$N_{\text{LinkingID}}$	108
Observations	324
Marginal R^2 / Conditional R^2	0.035 / 0.786

```
tab_model(hi_com_wb, show.intercept = F, show.se = T)
```

PWB RC				
Predictors	Estimates	std. Error	CI	p
time cent	-0.06	0.03	-0.12 – -0.01	0.024
COMMUNION between cent	0.16	0.27	-0.37 – 0.69	0.554
COMMUNION within	-0.07	0.16	-0.38 – 0.23	0.647

time cent × COMMUNION between cent	0.06	0.10	-0.14 – 0.25	0.568
time cent × COMMUNION within	0.06	0.13	-0.19 – 0.32	0.619

Random Effects

σ^2	0.13
T00 LinkingID	0.49
T11 LinkingID.time_cent	0.02
ρ_{01} LinkingID	-0.32
ICC	0.78
N LinkingID	108
Observations	324
Marginal R ² / Conditional R ²	0.011 / 0.784

Model S3

Tertiary: Testing Interdependence and Disconnection in the Same Model

To test whether the effect of interdependence could be accounted for by the effect of disconnection, we tested the within-person component of interdependence and the within-person component of disconnection together in the same model:

```
int_com_wb <- lmer(PWB_RC ~ time_cent * INTERDEPENDENCE_between_cent + time_cent * INTERDEPENDENCE_within + time_cent * DISCONNECTION_between_cent + time_cent * DISCONNECTION_within + (time_cent|LinkingID), dc_long_strict)
tab_model(int_com_wb, show.intercept = F, show.se = T)
```

Predictors	PWB RC			
	Estimates	std. Error	CI	p
time cent	-0.09	0.03	-0.15 – -0.03	0.002
INTERDEPENDENCE between cent	0.14	0.63	-1.11 – 1.38	0.831
INTERDEPENDENCE within	-0.64	0.29	-1.22 – -0.06	0.031
DISCONNECTION between cent	-0.77	0.24	-1.24 – -0.30	0.001
DISCONNECTION within	-0.24	0.15	-0.53 – 0.04	0.097

time cent × INTERDEPENDENCE between cent	0.29	0.24	-0.19 – 0.77	0.240
time cent × INTERDEPENDENCE within	0.59	0.24	0.12 – 1.05	0.014
time cent × DISCONNECTION between cent	0.02	0.09	-0.16 – 0.20	0.830
time cent × DISCONNECTION within	0.36	0.11	0.14 – 0.59	0.001

Random Effects

σ^2	0.11
T00 LinkingID	0.44
T11 LinkingID.time_cent	0.02
P01 LinkingID	-0.21
ICC	0.79
N _{LinkingID}	108

Observations 324

Marginal R² / Conditional R² 0.101 / 0.815

All main effects and interactions remain significant, indicating that the effects of interdependence and disconnection and well-being were distinct and non-overlapping.

Supplemental Analyses

Agency and Independence

Given conceptual relationships between agency and independence, it may be informative to look at both of these variables in the same model.

```
ind_agn_wb <- lmer(PWB_RC ~ time_cent * INDEPENDENCE_between + time_cent * INDEPENDENCE_within +
time_cent * AGENCY_between + time_cent * AGENCY_within + time_cent * SUBMISSIVENESS_between + ti
me_cent * SUBMISSIVENESS_within + (time_cent|LinkingID),
                dc_long_strict)
tab_model(ind_agn_wb, show.intercept = F, show.se = T)
```

PWB RC				
Predictors	Estimates	std. Error	CI	p
time cent	-0.07	0.06	-0.20 – 0.06	0.284
INDEPENDENCE between	-0.23	0.53	-1.28 – 0.82	0.672
INDEPENDENCE within	0.06	0.24	-0.42 – 0.53	0.815

AGENCY between	0.44	0.33	-0.20 – 1.09	0.180
AGENCY within	0.24	0.19	-0.13 – 0.60	0.203
SUBMISSIVENESS between	-0.50	0.25	-0.99 – -0.02	0.042
SUBMISSIVENESS within	-0.08	0.13	-0.34 – 0.19	0.567
time cent × INDEPENDENCE between	-0.23	0.21	-0.64 – 0.17	0.256
time cent × INDEPENDENCE within	-0.02	0.20	-0.42 – 0.39	0.939
time cent × AGENCY between	0.11	0.12	-0.14 – 0.35	0.390
time cent × AGENCY within	-0.13	0.16	-0.45 – 0.18	0.414
time cent × SUBMISSIVENESS between	0.02	0.09	-0.16 – 0.21	0.801
time cent × SUBMISSIVENESS within	0.08	0.11	-0.15 – 0.30	0.508

Random Effects

σ^2	0.13
T00 LinkingID	0.48
T11 LinkingID.time_cent	0.02
P01 LinkingID	-0.36
ICC	0.77
N LinkingID	108

Observations 324

Marginal R^2 / Conditional R^2 0.064 / 0.789

There is one barely significant effect ($p = .044$) suggesting that low levels of constraint (i.e., negative/thwarted agency) were associated with higher levels of well-being throughout the study period.

Communion and Dependence

Finally, given conceptual relationships between communion and dependence, it may be informative to look at both of these variables in the same model.

```
dep_com_wb <- lmer(PWB_RC ~ time_cent * DEPENDENCE_between + time_cent * DEPENDENCE_within + time_cent * COMMUNION_between + time_cent * COMMUNION_within + time_cent * DISCONNECTION_between + time_cent * DISCONNECTION_within + (time_cent|LinkingID),
                  dc_long_strict)
tab_model(dep_com_wb, show.intercept = F, show.se = T)
```

PWB RC				
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	-0.13	0.06	-0.24 – -0.01	0.030
DEPENDENCE between	-0.12	0.30	-0.72 – 0.47	0.682
DEPENDENCE within	-0.20	0.14	-0.48 – 0.08	0.158
COMMUNION between	0.38	0.27	-0.16 – 0.91	0.167
COMMUNION within	-0.06	0.15	-0.36 – 0.24	0.687
DISCONNECTION between	-0.82	0.26	-1.33 – -0.30	0.002
DISCONNECTION within	-0.21	0.15	-0.51 – 0.09	0.162
time cent × DEPENDENCE between	-0.02	0.12	-0.26 – 0.21	0.841
time cent × DEPENDENCE within	0.29	0.12	0.05 – 0.53	0.017
time cent × COMMUNION between	0.06	0.10	-0.14 – 0.27	0.545
time cent × COMMUNION within	0.01	0.12	-0.24 – 0.25	0.955
time cent × DISCONNECTION between	0.06	0.10	-0.14 – 0.25	0.565
time cent × DISCONNECTION within	0.36	0.12	0.13 – 0.59	0.002

Random Effects

σ^2	0.12
T00 LinkingID	0.44
T11 LinkingID.time_cent	0.02
P01 LinkingID	-0.30
ICC	0.78
N _{LinkingID}	108
Observations	324
Marginal R ² / Conditional R ²	0.124 / 0.806

All the effects for disconnection remain significant when holding the effects of dependence constant. Additionally, when holding the effects of disconnection constant, an interaction appears between dependence and time.

```

dep_com_eff <- Effect(c("DEPENDENCE_within", "time_cent"), dep_com_wb,
                     xlevels = list(DEPENDENCE_within = c(-.31, .31),
                                     time_cent = c(0, 1, 2))) %>%

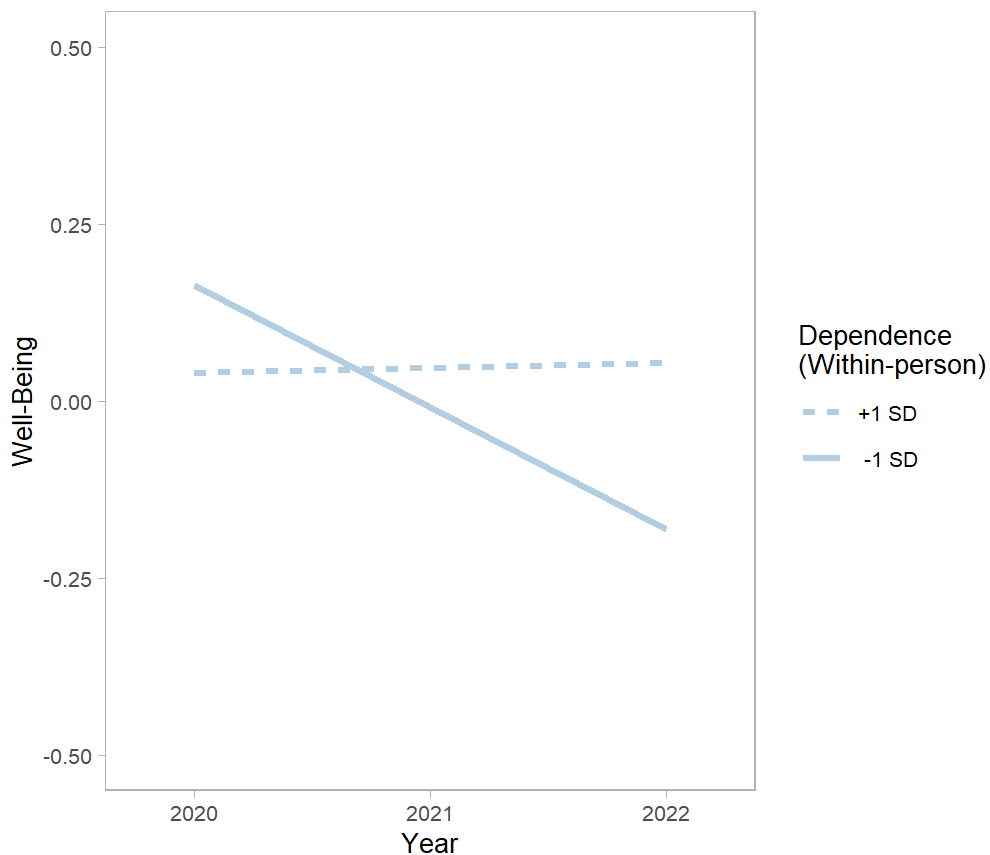
as.data.frame() %>%
mutate(Year = time_cent + 2020,
       dep_within = factor(DEPENDENCE_within, labels = c(" -1 SD", "+1 SD")))

dep_com_plot <- ggplot(dep_com_eff, aes(x = Year, y = fit, linetype = dep_within)) +
  geom_line(linewidth=1.2, color = "#B3CDE3") +
  labs(title="C. Well-Being",
       subtitle="As a function of Dependence, Adjusted for Communion and Disconnection",
       y = "Well-Being",
       x = "Year",
       linetype = "Dependence\n(Within-person)") +
  guides(fill="none",
         linetype = guide_legend(order = 1, reverse = TRUE)) +
  theme_light() +
  theme(text=element_text(size=10), aspect.ratio=1.2, panel.grid = element_blank(),
        #       legend.position = c(0.25, 0.85)
        legend.position = "right"
  ) +
  scale_x_continuous(breaks = c(2020, 2021, 2022)) +
  coord_cartesian(xlim = c(2019.75, 2022.25),
                 ylim = c(-.5, .5))
dep_com_plot

```

C. Well-Being

As a function of Dependence, Adjusted for Communion and Disconnection



From year to year, individuals fluctuate in the extent to which they narrate their life stories with themes of dependence. The effect of these within-person fluctuations on well-being evolved over the study period: as the study progressed, fluctuations below one's personal mean on dependence were associated with increasingly poor levels of well-being. Of note, a similar magnitude interaction effect was present in the simple dependence model which did not account for communion (see above), but in that model this effect did not reach significance ($p = .058$).

Supplemental S3

Models Without Interaction Terms

The interactive models above include main effects and interactions. Our primary study hypotheses relate to interactions. However, if we want to interpret main effects, we should re-run models without the interaction terms (to avoid statistical issues with interpreting main effects in the presence of interactions). This final section re-runs the primary and secondary analysis models above without interaction terms.

```
inter_wb_main <- dc_lmer_main("PWB_RC", "INTERDEPENDENCE", dc_long_strict)
lo_com_wb_main <- dc_lmer_main("PWB_RC", "DISCONNECTION", dc_long_strict)
indep_wb_main <- dc_lmer_main("PWB_RC", "INDEPENDENCE", dc_long_strict)
depen_wb_main <- dc_lmer_main("PWB_RC", "DEPENDENCE", dc_long_strict)
hi_agm_wb_main <- dc_lmer_main("PWB_RC", "AGENCY", dc_long_strict)
lo_agm_wb_main <- dc_lmer_main("PWB_RC", "SUBMISSIVENESS", dc_long_strict)
hi_com_wb_main <- dc_lmer_main("PWB_RC", "COMMUNION", dc_long_strict)

tab_model(inter_wb_main, show.intercept = F, show.se = T)
```

PWB RC				
Predictors	Estimates	std. Error	CI	p
time cent	-0.06	0.03	-0.12 – -0.01	0.024
INTERDEPENDENCE within	-0.05	0.15	-0.34 – 0.23	0.709
INTERDEPENDENCE between sqrt cent	0.04	0.60	-1.13 – 1.21	0.947

Random Effects

σ^2	0.13
T00 LinkingID	0.49
T11 LinkingID.time_cent	0.02
P01 LinkingID	-0.31
ICC	0.78
N _{LinkingID}	108
Observations	324
Marginal R ² / Conditional R ²	0.004 / 0.784

```
tab_model(lo_com_wb_main, show.intercept = F, show.se = T)
```

PWB RC				
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	-0.09	0.03	-0.15 – -0.03	0.003
DISCONNECTION within	0.17	0.08	0.02 – 0.33	0.026
DISCONNECTION between cent	-0.70	0.21	-1.12 – -0.28	0.001

Random Effects

σ^2	0.12
T00 LinkingID	0.45
T11 LinkingID.time_cent	0.02
ρ_{01} LinkingID	-0.32
ICC	0.78
N LinkingID	108
Observations	324
Marginal R ² / Conditional R ²	0.082 / 0.798

```
tab_model(indep_wb_main, show.intercept = F, show.se = T)
```

PWB RC				
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	-0.05	0.03	-0.11 – 0.00	0.056
INDEPENDENCE within	0.13	0.11	-0.09 – 0.35	0.240
INDEPENDENCE between sqrt cent	-0.31	0.40	-1.09 – 0.48	0.440

Random Effects

σ^2	0.13
T00 LinkingID	0.49
T11 LinkingID.time_cent	0.02
ρ_{01} LinkingID	-0.31
ICC	0.78
N LinkingID	108
Observations	324
Marginal R ² / Conditional R ²	0.010 / 0.786

```
tab_model(depen_wb_main, show.intercept = F, show.se = T)
```

PWB RC				
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	-0.06	0.03	-0.11 – -0.00	0.038
DEPENDENCE within	0.06	0.07	-0.08 – 0.19	0.414
DEPENDENCE between sqrt cent	-0.46	0.25	-0.96 – 0.04	0.073

Random Effects

σ^2	0.13
T00 LinkingID	0.48
T11 LinkingID.time_cent	0.02
ρ_{01} LinkingID	-0.33
ICC	0.78
N LinkingID	108
Observations	324
Marginal R ² / Conditional R ²	0.029 / 0.786

```
tab_model(hi_agn_wb_main, show.intercept = F, show.se = T)
```

PWB RC				
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	-0.06	0.03	-0.11 – -0.00	0.040
AGENCY within	0.11	0.08	-0.05 – 0.28	0.172
AGENCY between sqrt cent	0.24	0.25	-0.25 – 0.73	0.341

Random Effects

σ^2	0.12
T00 LinkingID	0.49
T11 LinkingID.time_cent	0.02
ρ_{01} LinkingID	-0.31
ICC	0.79
N LinkingID	108
Observations	324
Marginal R ² / Conditional R ²	0.013 / 0.789

```
tab_model(lo_agn_wb_main, show.intercept = F, show.se = T)
```

PWB RC				
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	-0.06	0.03	-0.12 – -0.01	0.025
SUBMISSIVENESS within	-0.01	0.07	-0.15 – 0.12	0.853
SUBMISSIVENESS between cent	-0.41	0.21	-0.82 – -0.01	0.046

Random Effects

σ^2	0.13
T00 LinkingID	0.47
T11 LinkingID.time_cent	0.02
P01 LinkingID	-0.31
ICC	0.78
N LinkingID	108
Observations	324
Marginal R ² / Conditional R ²	0.034 / 0.785

```
tab_model(hi_com_wb_main, show.intercept = F, show.se = T)
```

PWB RC				
<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	-0.06	0.03	-0.11 – -0.01	0.025
COMMUNION within	-0.01	0.08	-0.16 – 0.14	0.906
COMMUNION between cent	0.22	0.25	-0.26 – 0.70	0.370

Random Effects

σ^2	0.13
T00 LinkingID	0.49
T11 LinkingID.time_cent	0.02
P01 LinkingID	-0.31
ICC	0.78
N LinkingID	108
Observations	324
Marginal R ² / Conditional R ²	0.010 / 0.785

Supplemental S4

Models With Covariates

The interactive models above include main effects and interactions. Our primary study hypotheses relate to interactions. However, if we want to interpret main effects, we should re-run models without the interaction terms (to avoid statistical issues with interpreting main effects in the presence of interactions). This final section re-runs the primary and secondary analysis models above without interaction terms.

```
inter_wb_cov <- dc_lmer_cov("PWB_RC", "INTERDEPENDENCE", dc_long_strict)
lo_com_wb_cov <- dc_lmer_cov("PWB_RC", "DISCONNECTION", dc_long_strict)
indep_wb_cov <- dc_lmer_cov("PWB_RC", "INDEPENDENCE", dc_long_strict)
depen_wb_cov <- dc_lmer_cov("PWB_RC", "DEPENDENCE", dc_long_strict)
hi_agm_wb_cov <- dc_lmer_cov("PWB_RC", "AGENCY", dc_long_strict)
lo_agm_wb_cov <- dc_lmer_cov("PWB_RC", "SUBMISSIVENESS", dc_long_strict)
hi_com_wb_cov <- dc_lmer_cov("PWB_RC", "COMMUNION", dc_long_strict)

tab_model(inter_wb_cov, show.intercept = F, show.se = T)
```

PWB RC				
Predictors	Estimates	std. Error	CI	p
time cent	-0.06	0.03	-0.11 – -0.00	0.037
INTERDEPENDENCE between sqrt cent	-0.41	0.58	-1.56 – 0.73	0.480
INTERDEPENDENCE within	-0.61	0.30	-1.20 – -0.03	0.041
pre mh	-0.61	0.14	-0.89 – -0.33	<0.001
age	0.01	0.01	0.00 – 0.02	0.015
gender f	-0.15	0.17	-0.47 – 0.18	0.383
gender tg	-0.07	0.21	-0.48 – 0.34	0.735
education	0.24	0.05	0.14 – 0.34	<0.001
time_cent:INTERDEPENDENCE_between_sqrt_cent	0.25	0.24	-0.23 – 0.73	0.305
time_cent:INTERDEPENDENCE_within	0.54	0.24	0.07 – 1.01	0.024

Random Effects

σ^2	0.12
T00 LinkingID	0.32
T11 LinkingID.time_cent	0.02
P01 LinkingID	-0.15
ICC	0.73

N LinkingID	108
Observations	324
Marginal R ² / Conditional R ²	0.266 / 0.801

```
tab_model(lo_com_wb_cov, show.intercept = F, show.se = T)
```

<i>Predictors</i>	PWB RC			
	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	-0.10	0.03	-0.16 – -0.04	0.001
DISCONNECTION between cent	-0.64	0.22	-1.08 – -0.21	0.003
DISCONNECTION within	-0.19	0.15	-0.48 – 0.09	0.182
pre mh	-0.54	0.14	-0.81 – -0.27	<0.001
age	0.01	0.01	0.00 – 0.02	0.020
gender f	-0.04	0.17	-0.36 – 0.29	0.821
gender tg	0.06	0.20	-0.35 – 0.46	0.786
education	0.24	0.05	0.15 – 0.33	<0.001
time_cent:DISCONNECTION_between_cent	0.03	0.09	-0.15 – 0.20	0.768
time_cent:DISCONNECTION_within	0.33	0.11	0.11 – 0.55	0.004

Random Effects

σ^2	0.12
T00 LinkingID	0.29
T11 LinkingID.time_cent	0.02
P01 LinkingID	-0.17
ICC	0.72
N LinkingID	108
Observations	324
Marginal R ² / Conditional R ²	0.316 / 0.808

```
tab_model(indep_wb_cov, show.intercept = F, show.se = T)
```

<i>Predictors</i>	PWB RC			
	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	-0.06	0.03	-0.11 – -0.00	0.048

INDEPENDENCE between sqrt cent	-0.23	0.39	-1.01 – 0.55	0.560
INDEPENDENCE within	0.28	0.21	-0.13 – 0.69	0.176
pre mh	-0.59	0.14	-0.87 – -0.31	<0.001
age	0.01	0.01	0.00 – 0.02	0.012
gender f	-0.16	0.16	-0.48 – 0.17	0.337
gender tgd	-0.08	0.21	-0.49 – 0.32	0.682
education	0.24	0.05	0.14 – 0.33	<0.001
time_cent:INDEPENDENCE_between_sqrt_cent	-0.10	0.17	-0.42 – 0.23	0.564
time_cent:INDEPENDENCE_within	-0.16	0.18	-0.51 – 0.18	0.355

Random Effects

σ^2	0.13
T00 LinkingID	0.31
T11 LinkingID.time_cent	0.01
P01 LinkingID	-0.17
ICC	0.71
N _{LinkingID}	108

Observations 324

Marginal R² / Conditional R² 0.266 / 0.787

```
tab_model(depen_wb_cov, show.intercept = F, show.se = T)
```

PWB RC

<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	-0.05	0.03	-0.10 – 0.01	0.083
DEPENDENCE between sqrt cent	-0.06	0.26	-0.58 – 0.45	0.809
DEPENDENCE within	-0.17	0.14	-0.45 – 0.11	0.230
pre mh	-0.58	0.14	-0.86 – -0.30	<0.001
age	0.01	0.01	0.00 – 0.02	0.018
gender f	-0.13	0.17	-0.47 – 0.20	0.438
gender tgd	-0.09	0.21	-0.50 – 0.33	0.686

education	0.23	0.05	0.14 – 0.33	<0.001
time_cent:DEPENDENCE_between_sqrt_cent	-0.01	0.11	-0.22 – 0.20	0.906
time_cent:DEPENDENCE_within	0.21	0.12	-0.02 – 0.45	0.077

Random Effects

σ^2	0.13
T00 LinkingID	0.32
T11 LinkingID.time_cent	0.01
ρ_{01} LinkingID	-0.21
ICC	0.72
N _{LinkingID}	108

Observations	324
--------------	-----

Marginal R ² / Conditional R ²	0.264 / 0.790
--	---------------

```
tab_model(hi_ag_nwb_cov, show.intercept = F, show.se = T)
```

PWB RC

<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	-0.06	0.03	-0.11 – -0.00	0.043
AGENCY between sqrt cent	0.13	0.26	-0.38 – 0.64	0.613
AGENCY within	0.21	0.16	-0.10 – 0.52	0.191
pre mh	-0.63	0.14	-0.91 – -0.34	<0.001
age	0.01	0.01	0.00 – 0.02	0.038
gender f	-0.17	0.17	-0.49 – 0.16	0.321
gender tg	-0.11	0.20	-0.51 – 0.30	0.600
education	0.23	0.05	0.13 – 0.32	<0.001
time_cent:AGENCY_between_sqrt_cent	0.04	0.10	-0.17 – 0.24	0.712
time_cent:AGENCY_within	-0.09	0.14	-0.37 – 0.18	0.505

Random Effects

σ^2	0.12
T00 LinkingID	0.33
T11 LinkingID.time_cent	0.02
ρ_{01} LinkingID	-0.23

ICC	0.72
N _{LinkingID}	108
Observations	324
Marginal R ² / Conditional R ²	0.263 / 0.794

```
tab_model(lo_agn_wb_cov, show.intercept = F, show.se = T)
```

<i>Predictors</i>	PWB RC			
	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	-0.06	0.03	-0.12 – -0.01	0.024
SUBMISSIVENESS between cent	-0.21	0.22	-0.64 – 0.22	0.332
SUBMISSIVENESS within	-0.07	0.13	-0.33 – 0.19	0.598
pre mh	-0.56	0.15	-0.84 – -0.27	<0.001
age	0.01	0.01	0.00 – 0.02	0.016
gender f	-0.12	0.17	-0.45 – 0.21	0.480
gender tgd	-0.05	0.21	-0.46 – 0.36	0.808
education	0.24	0.05	0.14 – 0.33	<0.001
time_cent:SUBMISSIVENESS_between_cent	-0.01	0.09	-0.18 – 0.16	0.915
time_cent:SUBMISSIVENESS_within	0.06	0.11	-0.16 – 0.28	0.598

Random Effects

σ^2	0.13
T ₀₀ LinkingID	0.32
T ₁₁ LinkingID.time_cent	0.02
P ₀₁ LinkingID	-0.22
ICC	0.72
N _{LinkingID}	108
Observations	324
Marginal R ² / Conditional R ²	0.265 / 0.791

```
tab_model(hi_com_wb_cov, show.intercept = F, show.se = T)
```

<i>Predictors</i>	PWB RC			
	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>

time cent	-0.06	0.03	-0.12 – -0.01	0.024
COMMUNION between cent	0.13	0.24	-0.33 – 0.60	0.578
COMMUNION within	-0.07	0.15	-0.37 – 0.23	0.654
pre mh	-0.60	0.14	-0.88 – -0.33	<0.001
age	0.01	0.01	0.00 – 0.02	0.019
gender f	-0.18	0.17	-0.51 – 0.15	0.290
gender tg	-0.13	0.21	-0.54 – 0.28	0.527
education	0.23	0.05	0.14 – 0.33	<0.001
time_cent:COMMUNION_between_cent	0.06	0.10	-0.14 – 0.25	0.564
time_cent:COMMUNION_within	0.06	0.13	-0.18 – 0.31	0.607

Random Effects

σ^2	0.13
T00 LinkingID	0.32
T11 LinkingID.time_cent	0.02
P01 LinkingID	-0.21
ICC	0.71
N _{LinkingID}	108
Observations	324
Marginal R ² / Conditional R ²	0.263 / 0.789

Supplemental S5

Models in Preregistration

Note that the analyses above were slightly simplified from the original preregistered models, which specified that variables would be entered in blocks (independent + dependent + interdependent vs agency + communion). Those preregistered analyses are reported here. Findings are similar to the simpler models.

```
mod1 <- lmer(PWB_RC ~ time_cent * INTERDEPENDENCE_within +
  time_cent * INDEPENDENCE_within +
  time_cent * DEPENDENCE_within +
  time_cent * INTERDEPENDENCE_between_sqrt_cent +
  time_cent * INDEPENDENCE_between_sqrt_cent +
  time_cent * DEPENDENCE_between_sqrt_cent +
  (time_cent | LinkingID), dc_long_strict)
tab_model(mod1, show.intercept = F, show.se = T, title = "Hypothesis 12.5.1")
```

Hypothesis 12.5.1

<i>Predictors</i>	PWB RC			
	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	-0.04	0.03	-0.10 – 0.02	0.159
INTERDEPENDENCE within	-0.61	0.31	-1.21 – -0.00	0.048
INDEPENDENCE within	0.24	0.21	-0.18 – 0.66	0.258
DEPENDENCE within	-0.18	0.14	-0.46 – 0.10	0.207
INTERDEPENDENCE between sqrt cent	0.11	0.67	-1.22 – 1.44	0.872
INDEPENDENCE between sqrt cent	-0.09	0.45	-0.98 – 0.80	0.840
DEPENDENCE between sqrt cent	-0.38	0.30	-0.97 – 0.21	0.204
time cent × INTERDEPENDENCE within	0.50	0.25	0.02 – 0.98	0.042
time cent × INDEPENDENCE within	-0.16	0.18	-0.51 – 0.20	0.391
time cent × DEPENDENCE within	0.23	0.12	-0.01 – 0.47	0.063
time cent × INTERDEPENDENCE between sqrt cent	0.24	0.25	-0.24 – 0.73	0.325
time cent × INDEPENDENCE between sqrt cent	-0.08	0.17	-0.41 – 0.25	0.624
time cent × DEPENDENCE between sqrt cent	-0.03	0.11	-0.25 – 0.19	0.786
Random Effects				
σ^2	0.13			
T00 LinkingID	0.49			
T11 LinkingID.time_cent	0.01			
P01 LinkingID	-0.32			
ICC	0.78			
N _{LinkingID}	108			
Observations	324			

Marginal R² / Conditional R² 0.042 / 0.794

```
mod2 <- lmer(PWB_RC ~ time_cent * INTERDEPENDENCE_within +
             time_cent * INDEPENDENCE_within +
             time_cent * DEPENDENCE_within +
             time_cent * INTERDEPENDENCE_between_sqrt_cent +
             time_cent * INDEPENDENCE_between_sqrt_cent +
             time_cent * DEPENDENCE_between_sqrt_cent +
             pre_mh + age + gender_f + gender_tgd + education +
             (time_cent | LinkingID), dc_long_strict)
tab_model(mod2, show.intercept = F, show.se = T, title = "Hypothesis 12.5.2")
```

Hypothesis 12.5.2

<i>Predictors</i>	PWB RC			
	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	-0.04	0.03	-0.10 – 0.02	0.155
INTERDEPENDENCE within	-0.60	0.30	-1.19 – -0.01	0.046
INDEPENDENCE within	0.29	0.21	-0.12 – 0.70	0.171
DEPENDENCE within	-0.16	0.14	-0.44 – 0.12	0.263
INTERDEPENDENCE between sqrt cent	-0.37	0.60	-1.54 – 0.80	0.535
INDEPENDENCE between sqrt cent	-0.22	0.40	-1.01 – 0.57	0.582
DEPENDENCE between sqrt cent	0.00	0.27	-0.53 – 0.54	0.988
pre mh	-0.58	0.15	-0.87 – -0.30	<0.001
age	0.01	0.01	0.00 – 0.02	0.013
gender f	-0.15	0.17	-0.49 – 0.19	0.395
gender tgd	-0.06	0.22	-0.48 – 0.37	0.798
education	0.24	0.05	0.14 – 0.34	<0.001
time_cent:INTERDEPENDENCE_within	0.51	0.24	0.04 – 0.99	0.035
time_cent:INDEPENDENCE_within	-0.20	0.18	-0.55 – 0.16	0.274
time_cent:DEPENDENCE_within	0.21	0.12	-0.03 – 0.44	0.086
time_cent:INTERDEPENDENCE_between_sqrt_cent	0.25	0.25	-0.24 – 0.73	0.318
time_cent:INDEPENDENCE_between_sqrt_cent	-0.08	0.17	-0.41 – 0.25	0.640

time_cent:DEPENDENCE_between_sqrt_cent -0.04 0.11 -0.26 – 0.19 0.742

Random Effects

σ^2 0.13

T00 LinkingID 0.32

T11 LinkingID.time_cent 0.01

P01 LinkingID -0.12

ICC 0.72

N LinkingID 108

Observations 324

Marginal R² / Conditional R² 0.273 / 0.798

```
mod3 <- lmer(PWB_RC ~ time_cent * AGENCY_within +
              time_cent * SUBMISSIVENESS_within +
              time_cent * COMMUNION_within +
              time_cent * DISCONNECTION_within +
              time_cent * AGENCY_between_sqrt_cent +
              time_cent * SUBMISSIVENESS_between_cent +
              time_cent * COMMUNION_between_cent +
              time_cent * DISCONNECTION_between_cent +
              (time_cent | LinkingID), dc_long_strict)
tab_model(mod3, show.intercept = F, show.se = T, title = "Hypothesis 12.5.3")
```

Hypothesis 12.5.3

<i>Predictors</i>	PWB RC			
	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	-0.10	0.03	-0.16 – -0.03	0.002
AGENCY within	0.21	0.17	-0.12 – 0.54	0.205
SUBMISSIVENESS within	-0.10	0.13	-0.37 – 0.16	0.445
COMMUNION within	-0.08	0.15	-0.38 – 0.22	0.593
DISCONNECTION within	-0.12	0.16	-0.43 – 0.19	0.443
AGENCY between sqrt cent	0.43	0.28	-0.12 – 0.98	0.125
SUBMISSIVENESS between cent	-0.20	0.26	-0.71 – 0.30	0.424
COMMUNION between cent	0.27	0.27	-0.26 – 0.79	0.316
DISCONNECTION between cent	-0.83	0.27	-1.37 – -0.29	0.002

time cent × AGENCY within	-0.08	0.14	-0.36 – 0.20	0.573
time cent × SUBMISSIVENESS within	0.09	0.11	-0.14 – 0.31	0.433
time cent × COMMUNION within	0.05	0.13	-0.20 – 0.30	0.685
time cent × DISCONNECTION within	0.28	0.12	0.04 – 0.51	0.020
time cent × AGENCY between sqrt cent	0.00	0.11	-0.22 – 0.22	0.989
time cent × SUBMISSIVENESS between cent	0.02	0.10	-0.18 – 0.22	0.869
time cent × COMMUNION between cent	0.06	0.11	-0.15 – 0.27	0.564
time cent × DISCONNECTION between cent	0.03	0.11	-0.18 – 0.24	0.764

Random Effects

σ^2	0.12
T00 LinkingID	0.44
T11 LinkingID.time_cent	0.02
P01 LinkingID	-0.30
ICC	0.78
N _{LinkingID}	108
Observations	324
Marginal R ² / Conditional R ²	0.132 / 0.808

```
mod4 <- lmer(PWB_RC ~ time_cent * AGENCY_within +
             time_cent * SUBMISSIVENESS_within +
             time_cent * COMMUNION_within +
             time_cent * DISCONNECTION_within +
             time_cent * AGENCY_between_sqrt_cent +
             time_cent * SUBMISSIVENESS_between_cent +
             time_cent * COMMUNION_between_cent +
             time_cent * DISCONNECTION_between_cent +
             pre_mh + age + gender_f + gender_tgd + education +
             (time_cent | LinkingID), dc_long_strict)
tab_model(mod4, show.intercept = F, show.se = T, title = "Hypothesis 12.5.4")
```

Hypothesis 12.5.4

PWB RC

<i>Predictors</i>	<i>Estimates</i>	<i>std. Error</i>	<i>CI</i>	<i>p</i>
time cent	-0.10	0.03	-0.16 – -0.04	0.002
AGENCY within	0.19	0.16	-0.14 – 0.51	0.257
SUBMISSIVENESS within	-0.08	0.13	-0.34 – 0.18	0.555
COMMUNION within	-0.08	0.15	-0.38 – 0.21	0.580
DISCONNECTION within	-0.13	0.16	-0.44 – 0.17	0.389
AGENCY between sqrt cent	0.26	0.26	-0.25 – 0.77	0.319
SUBMISSIVENESS between cent	-0.03	0.23	-0.49 – 0.43	0.895
COMMUNION between cent	0.18	0.24	-0.28 – 0.65	0.445
DISCONNECTION between cent	-0.72	0.24	-1.20 – -0.24	0.003
pre mh	-0.57	0.14	-0.85 – -0.28	<0.001
age	0.01	0.01	-0.00 – 0.02	0.067
gender f	-0.07	0.17	-0.40 – 0.27	0.696
gender tg	0.04	0.21	-0.38 – 0.45	0.857
education	0.22	0.05	0.13 – 0.32	<0.001
time_cent:AGENCY_within	-0.05	0.14	-0.33 – 0.22	0.700
time_cent:SUBMISSIVENESS_within	0.07	0.11	-0.16 – 0.29	0.557
time_cent:COMMUNION_within	0.06	0.12	-0.19 – 0.30	0.642
time_cent:DISCONNECTION_within	0.29	0.12	0.06 – 0.52	0.014
time_cent:AGENCY_between_sqrt_cent	0.00	0.11	-0.21 – 0.22	0.975
time_cent:SUBMISSIVENESS_between_cent	0.02	0.10	-0.18 – 0.22	0.872
time_cent:COMMUNION_between_cent	0.06	0.11	-0.15 – 0.27	0.562
time_cent:DISCONNECTION_between_cent	0.03	0.11	-0.18 – 0.24	0.772

Random Effects

σ^2	0.12
T00 LinkingID	0.31

T11 LinkingID.time_cent	0.02
P01 LinkingID	-0.24
ICC	0.72
N _{LinkingID}	108
Observations	324
Marginal R ² / Conditional R ²	0.323 / 0.812

```
mod5 <- lmer(PWB_RC ~ time_cent * INTERDEPENDENCE_within +
             time_cent * INDEPENDENCE_within +
             time_cent * DEPENDENCE_within +
             time_cent * AGENCY_within +
             time_cent * SUBMISSIVENESS_within +
             time_cent * COMMUNION_within +
             time_cent * DISCONNECTION_within +
             time_cent * INTERDEPENDENCE_between_sqrt_cent +
             time_cent * INDEPENDENCE_between_sqrt_cent +
             time_cent * DEPENDENCE_between_sqrt_cent +
             time_cent * AGENCY_between_sqrt_cent +
             time_cent * SUBMISSIVENESS_between_cent +
             time_cent * COMMUNION_between_cent +
             time_cent * DISCONNECTION_between_cent +
             (time_cent | LinkingID), dc_long_strict)
tab_model(mod5, show.intercept = F, show.se = T, title = "Hypothesis 12.5.5")
```

Hypothesis 12.5.5

Predictors	PWB RC			
	Estimates	std. Error	CI	p
time cent	-0.07	0.03	-0.13 – -0.01	0.019
INTERDEPENDENCE within	-0.82	0.32	-1.44 – -0.20	0.010
INDEPENDENCE within	0.01	0.23	-0.46 – 0.47	0.981
DEPENDENCE within	-0.18	0.15	-0.48 – 0.12	0.230
AGENCY within	0.31	0.18	-0.05 – 0.67	0.094
SUBMISSIVENESS within	-0.06	0.14	-0.33 – 0.22	0.672
COMMUNION within	0.07	0.16	-0.24 – 0.38	0.666
DISCONNECTION within	-0.15	0.16	-0.46 – 0.15	0.328
INTERDEPENDENCE between sqrt cent	-0.44	0.73	-1.88 – 1.00	0.550
INDEPENDENCE between sqrt cent	-0.06	0.52	-1.08 – 0.96	0.903

DEPENDENCE between sqrt cent	-0.04	0.34	-0.71 – 0.63	0.902
AGENCY between sqrt cent	0.50	0.32	-0.14 – 1.14	0.126
SUBMISSIVENESS between cent	-0.19	0.29	-0.75 – 0.38	0.520
COMMUNION between cent	0.39	0.30	-0.21 – 0.99	0.201
DISCONNECTION between cent	-0.87	0.28	-1.41 – -0.32	0.002
time cent × INTERDEPENDENCE within	0.78	0.26	0.26 – 1.30	0.004
time cent × INDEPENDENCE within	-0.05	0.20	-0.45 – 0.35	0.813
time cent × DEPENDENCE within	0.31	0.13	0.05 – 0.57	0.019
time cent × AGENCY within	-0.12	0.16	-0.43 – 0.19	0.447
time cent × SUBMISSIVENESS within	-0.01	0.12	-0.25 – 0.23	0.924
time cent × COMMUNION within	-0.14	0.14	-0.42 – 0.13	0.295
time cent × DISCONNECTION within	0.34	0.12	0.11 – 0.58	0.005
time cent × INTERDEPENDENCE between sqrt cent	0.22	0.29	-0.34 – 0.79	0.437
time cent × INDEPENDENCE between sqrt cent	-0.24	0.21	-0.64 – 0.17	0.248
time cent × DEPENDENCE between sqrt cent	-0.10	0.14	-0.37 – 0.17	0.462
time cent × AGENCY between sqrt cent	0.06	0.13	-0.19 – 0.31	0.647
time cent × SUBMISSIVENESS between cent	0.11	0.11	-0.11 – 0.33	0.330
time cent × COMMUNION between cent	0.05	0.12	-0.19 – 0.28	0.690

time cent × DISCONNECTION between cent	0.09	0.11	-0.13 – 0.30	0.433
---	------	------	--------------	-------

Random Effects

σ^2	0.11
T00 LinkingID	0.44
T11 LinkingID.time_cent	0.02
ρ_{01} LinkingID	-0.27
ICC	0.80
N _{LinkingID}	108
Observations	324
Marginal R ² / Conditional R ²	0.158 / 0.828