

Metrics

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Labeling factors and exploring scales.

1 Data preliminaries

Initial point of departure - the [databox][databox] of the selected variables, described in the Methods chapter.

VARIABLE TITLE	Units	Codename	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
CV_SAMPLE_TYPE	1/0	sample	1997														
PUBID, YOUTH CASE IDENTIFICATION CODE	integers	id	1997														
KEYISEX, RS GENDER	m/f	sex	1997														
KEYIRACE_ETHNICITY, COMBINED RACE AND ETHNICITY	b/h/m/o	race	1997														
KEYIBDATE, RS BIRTHDATE MONTH/YEAR	01-12	bmonth	1997														
KEYIBDATE, RS BIRTHDATE MONTH/YEAR	years	byear	1997														
HOW OFTEN PR ATTEND CHURCH IN LAST YEAR?	1-8	attendPR	1997														
WHAT IS PRS CURRENT RELIGIOUS PREFERENCE?	1-8	relprefPR	1997														
WHAT RELIGION WAS PR RAISED IN?	1-8	relraisedPR	1997														
RS AGE IN MONTHS AS OF INTERVIEW DATE	months	agemon	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
RS AGE AT INTERVIEW DATE	years	ageyear	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
# DAYS PER WEEK TYPICALLY FAMILY DOES SOMETHING RELIGIOUS	# days	famrel	1997	1998	1999	2000											
HOW OFTEN R ATTENDED WORSHIP SERVICE IN PAST 12 MONTHS	1-8	attend				2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
R DOES NOT NEED RELIGION FOR GOOD VALUES	y/n	values						2002			2005			2008			2011
GOD NOTHING TO DO HAPPENS TO R	y/n	todo						2002			2005			2008			2011
R BELIEVES RELIGIOUS TEACHINGS ARE TO BE OBEYED EXACTLY AS WRITTEN	y/n	obeyed						2002			2005			2008			2011
R PRAYS MORE THAN ONCE A DAY	y/n	pray						2002			2005			2008			2011
R ASKS GOD HELP MAKE DECISIONS	y/n	decisions						2002			2005			2008			2011
WHAT IS R'S CURRENT RELIGIOUS PREFERENCE?	cats:35	relpref									2005			2008			2011
R A BORN-AGAIN EVANGELICAL CHRISTIAN?	y/n	bornagain												2008			2011
IMPORTANCE OF RELIGIOUS FAITH IN DAILY LIFE	1-5	faith												2008			2011
HOW OFTEN R FELT CALM AND PEACEFUL IN PAST MONTH	1-4	calm				2000		2002		2004		2006		2008		2010	
HOW OFTEN R FELT DOWN OR BLUE IN PAST MONTH	1-4	blue				2000		2002		2004		2006		2008		2010	
HOW OFTEN R HAS BEEN A HAPPY PERSON IN PAST MONTH	1-4	happy				2000		2002		2004		2006		2008		2010	
HOW OFTEN R DEPRESSED IN PAST MONTH	1-4	depressed				2000		2002		2004		2006		2008		2010	
HOW OFTEN R HAS BEEN A NERVOUS PERSON IN PAST MONTH	1-4	nervous				2000		2002		2004		2006		2008		2010	
HOW MANY HOURS PER WEEK DOES R WATCH TELEVISION	cats:6	tv						2002					2007	2008	2009	2010	2011
HOW MANY HOURS PER WEEK DOES R USE A COMPUTER	cats:6	computer						2002					2007	2008	2009	2010	2011
CURRENTLY HAVE ACCESS TO INTERNET?	y/n	internet						2002	2003	2004	2005	2006	2007	2008	2009	2010	2011

This [databox][databoxStatcanvas] corresponds to the dataset **dsL** produced by [Derive_dsL_from_Extract][derive] report, given in the Appendix.

```
dsL<-readRDS("./Data/Derived/dsL.rds")
```

Time Invariant									Time Variant																					
sample	id	sex	race	bmonth	byear	attendPR	relprefPR	relraisedPR	year	agemon	ageyear	famrel	attend	values	todo	obeyed	pray	decisions	relpref	bornagain	faith	calm	blue	happy	depressed	nervous	tv	computer	internet	
1	1	2	4	9	1981	7	21	21	1997	190	15	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1	1	2	4	9	1981	7	21	21	1998	206	17	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1	1	2	4	9	1981	7	21	21	1999	219	18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1	1	2	4	9	1981	7	21	21	2000	231	19	NA	1	NA	NA	NA	NA	NA	NA	NA	NA	3	3	3	3	3	3	NA	NA	
1	1	2	4	9	1981	7	21	21	2001	243	20	NA	6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1	1	2	4	9	1981	7	21	21	2002	256	21	NA	2	1	1	1	0	1	NA	NA	NA	4	2	3	2	1	2	5	NA	
1	1	2	4	9	1981	7	21	21	2003	266	22	NA	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1	
1	1	2	4	9	1981	7	21	21	2004	279	23	NA	1	NA	NA	NA	NA	NA	NA	NA	NA	4	1	4	1	1	1	NA	0	
1	1	2	4	9	1981	7	21	21	2005	290	24	NA	1	0	1	0	0	1	21	NA	NA	NA	NA	NA	NA	NA	NA	NA	1	
1	1	2	4	9	1981	7	21	21	2006	302	25	NA	1	NA	NA	NA	NA	NA	NA	NA	NA	4	1	4	1	1	1	NA	1	
1	1	2	4	9	1981	7	21	21	2007	313	26	NA	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2	6	1	
1	1	2	4	9	1981	7	21	21	2008	325	27	NA	1	0	1	0	0	1	21	NA	3	3	3	3	3	3	3	NA	1	
1	1	2	4	9	1981	7	21	21	2009	337	28	NA	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	2	6	1	
1	1	2	4	9	1981	7	21	21	2010	350	29	NA	1	NA	NA	NA	NA	NA	NA	NA	NA	3	3	3	3	3	3	1	6	1
1	1	2	4	9	1981	7	21	21	2011	360	29	NA	1	0	1	0	0	1	21	NA	1	NA	NA	NA	NA	NA	NA	6	1	
1	2	1	2	7	1982	NA	NA	NA	1997	178	14	3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
1	2	1	2	7	1982	NA	NA	NA	1998	196	16	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	

Figure 3.3 Generic dataset used in the current study, view for one [respondent](#)

Note that the variable **year** serves as a natural divided between time invariant (TIvars) and time variant (TVvars) variables. All modeling operations begin with subsetting this dataset. For the grammar rules of operations with relevant data see [Data Manipulation Guide][manipulate].

2 Labeling Factor Levels

Review of the item reference [cards][databoxStatcanvas] shows that initially, all items were recorded on some discrete scale, either counting occasions or assigning an integer to a category of response. However, data were saved as numerical values or integers

```
ds<- dsL %>%
  dplyr::select(
    sample, id, sex, race, bmonth,byear, attendPR, relprefPR,relraisedPR,
    year,
    agemon, ageyear, famrel, attend,
    values, todo, obeyed, pray, decisions,
    relpref, bornagain, faith,
    calm, blue, happy, depressed, nervous,
    tv, computer, internet)
str(ds)
```

```
'data.frame':  134745 obs. of  30 variables:
 $ sample   : int  1 1 1 1 1 1 1 1 1 1 ...
 $ id       : int  1 1 1 1 1 1 1 1 1 1 ...
 $ sex      : int  2 2 2 2 2 2 2 2 2 2 ...
 $ race     : int  4 4 4 4 4 4 4 4 4 4 ...
 $ bmonth   : int  9 9 9 9 9 9 9 9 9 9 ...
 $ byear    : int 1981 1981 1981 1981 1981 1981 1981 1981 1981 ...
 $ attendPR : int  7 7 7 7 7 7 7 7 7 7 ...
 $ relprefPR: int 21 21 21 21 21 21 21 21 21 21 ...
 $ relraisedPR: int 21 21 21 21 21 21 21 21 21 21 ...
 $ year     : int 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 ...
 $ agemon   : num 190 206 219 231 243 256 266 279 290 302 ...
 $ ageyear  : num 15 17 18 19 20 21 22 23 24 25 ...
 $ famrel   : num NA NA NA NA NA NA NA NA NA NA ...
 $ attend   : num NA NA NA 1 6 2 1 1 1 1 ...
 $ values   : num NA NA NA NA NA 1 NA NA 0 NA ...
 $ todo     : num NA NA NA NA NA 1 NA NA 1 NA ...
 $ obeyed   : num NA NA NA NA NA 1 NA NA 0 NA ...
 $ pray     : num NA NA NA NA NA 0 NA NA 0 NA ...
 $ decisions: num NA NA NA NA NA 1 NA NA 1 NA ...
```

```

$ relpref      : num  NA NA NA NA NA NA NA NA NA 21 NA ...
$ bornagain    : num  NA NA NA NA NA NA NA NA NA NA NA ...
$ faith        : num  NA NA NA NA NA NA NA NA NA NA NA ...
$ calm         : num  NA NA NA 3 NA 4 NA 4 NA 4 ...
$ blue         : num  NA NA NA 3 NA 2 NA 1 NA 1 ...
$ happy        : num  NA NA NA 3 NA 3 NA 4 NA 4 ...
$ depressed    : num  NA NA NA 3 NA 2 NA 1 NA 1 ...
$ nervous      : num  NA NA NA 3 NA 1 NA 1 NA 1 ...
$ tv           : num  NA NA NA NA NA 2 NA NA NA NA ...
$ computer     : num  NA NA NA NA NA 5 NA NA NA NA ...
$ internet     : num  NA NA NA NA NA NA 1 0 1 1 ...

```

[LabelingFactorLevels.R][labels] sourced at the end of [Derive_dsL_from_Extract][derive] matches numeric values with response labels from the questionnaire and adds to **dsL** copies of the variables, saved as labeled factors. For estimations routines such as lme4 or graphing functions such as ggplot2, the data type (string, numeric, factor) is a meaningful input, so a quick access to both formats frequently proves useful. It is convenient to think that **dsL** contains only

```
ncol(dsL)/2
```

```
[1] 30
```

variables, but each of them has a double, a labeled factor.

```
str(dsL)
```

```

'data.frame':  134745 obs. of  60 variables:
 $ sample      : int   1 1 1 1 1 1 1 1 1 1 ...
 $ id          : int   1 1 1 1 1 1 1 1 1 1 ...
 $ sex         : int   2 2 2 2 2 2 2 2 2 2 ...
 $ race        : int   4 4 4 4 4 4 4 4 4 4 ...
 $ bmonth      : int   9 9 9 9 9 9 9 9 9 9 ...
 $ byear       : int  1981 1981 1981 1981 1981 1981 1981 1981 1981 ...
 $ attendPR    : int   7 7 7 7 7 7 7 7 7 7 ...
 $ relprefPR   : int  21 21 21 21 21 21 21 21 21 21 ...
 $ relraisedPR : int  21 21 21 21 21 21 21 21 21 21 ...
 $ year        : int  1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 ...
 $ agemon      : num  190 206 219 231 243 256 266 279 290 302 ...
 $ ageyear     : num   15 17 18 19 20 21 22 23 24 25 ...
 $ famrel      : num   NA NA NA NA NA NA NA NA NA NA ...
 $ attend      : num   NA NA NA 1 6 2 1 1 1 1 ...
 $ values      : num   NA NA NA NA NA 1 NA NA 0 NA ...
 $ todo        : num   NA NA NA NA NA 1 NA NA 1 NA ...
 $ obeyed      : num   NA NA NA NA NA 1 NA NA 0 NA ...
 $ pray        : num   NA NA NA NA NA 0 NA NA 0 NA ...
 $ decisions   : num   NA NA NA NA NA 1 NA NA 1 NA ...
 $ relpref     : num   NA NA NA NA NA NA NA NA NA 21 NA ...
 $ bornagain   : num   NA NA NA NA NA NA NA NA NA NA NA ...
 $ faith       : num   NA NA NA NA NA NA NA NA NA NA NA ...
 $ calm        : num   NA NA NA 3 NA 4 NA 4 NA 4 ...
 $ blue        : num   NA NA NA 3 NA 2 NA 1 NA 1 ...
 $ happy       : num   NA NA NA 3 NA 3 NA 4 NA 4 ...
 $ depressed   : num   NA NA NA 3 NA 2 NA 1 NA 1 ...
 $ nervous     : num   NA NA NA 3 NA 1 NA 1 NA 1 ...

```

```

$ tv      : num  NA NA NA NA NA 2 NA NA NA NA ...
$ computer : num  NA NA NA NA NA 5 NA NA NA NA ...
$ internet : num  NA NA NA NA NA NA 1 0 1 1 ...
$ sampleF  : Ord.factor w/ 2 levels "Cross-Sectional"<...: 1 1 1 1 1 1 1 1 1 1 ...
$ idF      : Factor w/ 8983 levels "1","2","3","4",...: 1 1 1 1 1 1 1 1 1 1 ...
$ sexF     : Ord.factor w/ 3 levels "Male"<"Female"<...: 2 2 2 2 2 2 2 2 2 2 ...
$ raceF    : Ord.factor w/ 4 levels "Black"<"Hispanic"<...: 4 4 4 4 4 4 4 4 4 4 ...
$ bmonthF  : Ord.factor w/ 12 levels "Jan"<"Feb"<"Mar"<...: 9 9 9 9 9 9 9 9 9 9 ...
$ byearF   : Factor w/ 5 levels "1980","1981",...: 2 2 2 2 2 2 2 2 2 2 ...
$ attendPRF : Ord.factor w/ 8 levels "Never"<"Once or Twice"<...: 7 7 7 7 7 7 7 7 7 7 ...
$ relprefPRF : Ord.factor w/ 33 levels "Catholic"<"Baptist"<...: 21 21 21 21 21 21 21 21 21 21 ...
$ relraisedPRF: Ord.factor w/ 33 levels "Catholic"<"Baptist"<...: 21 21 21 21 21 21 21 21 21 21 ...
$ yearF    : Factor w/ 15 levels "1997","1998",...: 1 2 3 4 5 6 7 8 9 10 ...
$ agemonF  : Factor w/ 244 levels "146","147","148",...: 45 61 74 86 98 111 121 134 145 157 ...
$ ageyearF : Factor w/ 21 levels "12","13","14",...: 4 6 7 8 9 10 11 12 13 14 ...
$ famrelF  : Factor w/ 8 levels "0","1","2","3",...: NA NA NA NA NA NA NA NA NA ...
$ attendF  : Ord.factor w/ 8 levels "Never"<"Once or Twice"<...: NA NA NA 1 6 2 1 1 1 ...
$ valuesF  : Ord.factor w/ 2 levels "FALSE/less Religious"<...: NA NA NA NA NA 2 NA NA 1 NA ...
$ todoF    : Ord.factor w/ 2 levels "FALSE/less Religious"<...: NA NA NA NA NA 2 NA NA 2 NA ...
$ obeyedF  : Ord.factor w/ 2 levels "FALSE/less Religious"<...: NA NA NA NA NA 2 NA NA 1 NA ...
$ prayF    : Ord.factor w/ 2 levels "FALSE/less Religious"<...: NA NA NA NA NA 1 NA NA 1 NA ...
$ decisionsF : Ord.factor w/ 2 levels "FALSE/less Religious"<...: NA NA NA NA NA 2 NA NA 2 NA ...
$ relprefF  : Ord.factor w/ 33 levels "Catholic"<"Baptist"<...: NA NA NA NA NA NA NA NA NA 21 NA ...
$ bornagainF : Ord.factor w/ 2 levels "NO"<"YES": NA NA NA NA NA NA NA NA NA ...
$ faithF   : Ord.factor w/ 5 levels "Exrtremely"<"Very"<...: NA NA NA NA NA NA NA NA NA NA ...
$ calmF    : Ord.factor w/ 4 levels "All of the time"<...: NA NA NA NA NA NA NA NA NA NA ...
$ blueF    : Ord.factor w/ 4 levels "All of the time"<...: NA NA NA NA NA NA NA NA NA NA ...
$ happyF   : Ord.factor w/ 4 levels "All of the time"<...: NA NA NA NA NA NA NA NA NA NA ...
$ depressedF : Ord.factor w/ 4 levels "All of the time"<...: NA NA NA NA NA NA NA NA NA NA ...
$ nervousF : Ord.factor w/ 4 levels "All of the time"<...: NA NA NA NA NA NA NA NA NA NA ...
$ tvF      : Ord.factor w/ 6 levels "less than 2"<...: NA NA NA NA NA 2 NA NA NA NA ...
$ computerF : Ord.factor w/ 6 levels "None"<"less than 1"<...: NA NA NA NA NA 5 NA NA NA NA ...
$ internetF : Ord.factor w/ 2 levels "No"<"Yes": NA NA NA NA NA NA 2 1 2 2 ...

```

This give a certain flexibility in assembling needed dataset quickly and have access to factor labels. One can alternate between the raw metric and labeled factor by adding "F" suffix to the end of the variable name:

```

ds<- dsL %>%
  dplyr::filter(id==25) %>%
  dplyr::select(id,byear,year, attend,attendF)
ds

```

	id	byear	year	attend	attendF
1	25	1983	1997	NA	<NA>
2	25	1983	1998	NA	<NA>
3	25	1983	1999	NA	<NA>
4	25	1983	2000	5	About twice/month
5	25	1983	2001	7	Several times/week
6	25	1983	2002	7	Several times/week
7	25	1983	2003	2	Once or Twice
8	25	1983	2004	7	Several times/week
9	25	1983	2005	5	About twice/month
10	25	1983	2006	7	Several times/week
11	25	1983	2007	5	About twice/month

12	25	1983	2008	7	Several times/week
13	25	1983	2009	7	Several times/week
14	25	1983	2010	7	Several times/week
15	25	1983	2011	7	Several times/week

Having quick access to factor labels will be especially useful during graph production.

3 Time metrics : Age, Period, Cohort

NLSY97 sample includes individuals from five cohorts, born between 1980 and 1984. The following graphics shows how birth cohort, age of respondents, and round of observation are related in NSLY97.

Wide age	Age in years																			
	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	
Born in 1980					1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	
1981				1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011		
1982			1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011			
1983		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011				
1984	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011					
Wave																				

Wide wave	Waves of measurement														
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Born in 1980	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
1981	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1982	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1983	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
1984	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Age															

Long wave	Wave	Born in				
		1980	1981	1982	1983	1984
	1997	17	16	15	14	13
	1998	18	17	16	15	14
	1999	19	18	17	16	15
	2000	20	19	18	17	16
	2001	21	20	19	18	17
	2002	22	21	20	19	18
	2003	23	22	21	20	19
	2004	24	23	22	21	20
	2005	25	24	23	22	21
	2006	26	25	24	23	22
	2007	27	26	25	24	23
	2008	28	27	26	25	24
	2009	29	28	27	26	25
	2010	30	29	28	27	26
	2011	31	30	29	28	27
Age						

Long age	Age years	Born in				
		1980	1981	1982	1983	1984
	13					1997
	14				1997	1998
	15			1997	1998	1999
	16		1997	1998	1999	2000
	17	1997	1998	1999	2000	2001
	18	1998	1999	2000	2001	2002
	19	1999	2000	2001	2002	2003
	20	2000	2001	2002	2003	2004
	21	2001	2002	2003	2004	2005
	22	2002	2003	2004	2005	2006
	23	2003	2004	2005	2006	2007
	24	2004	2005	2006	2007	2008
	25	2005	2006	2007	2008	2009
	26	2006	2007	2008	2009	2010
	27	2007	2008	2009	2010	2011
	28	2008	2009	2010	2011	
	29	2009	2010	2011		
	30	2010	2011			
	31	2011				
Wave						

NSLY97 contains static (**bmonth**, **byear**) and dynamic (**agemon**, **ageyear**) indicators of age :

```
ds<- dsL %>%
  dplyr::filter(id==25, year %in% c(1997:2011)) %>%
  dplyr::select(id,byear,bmonthF,year,agemon,ageyear)
print(ds)
```

```
id byear bmonthF year agemon ageyear
```

1	25	1983	Mar	1997	167	13
2	25	1983	Mar	1998	188	15
3	25	1983	Mar	1999	201	16
4	25	1983	Mar	2000	214	17
5	25	1983	Mar	2001	226	18
6	25	1983	Mar	2002	236	19
7	25	1983	Mar	2003	254	21
8	25	1983	Mar	2004	261	21
9	25	1983	Mar	2005	272	22
10	25	1983	Mar	2006	284	23
11	25	1983	Mar	2007	295	24
12	25	1983	Mar	2008	307	25
13	25	1983	Mar	2009	319	26
14	25	1983	Mar	2010	332	27
15	25	1983	Mar	2011	342	28

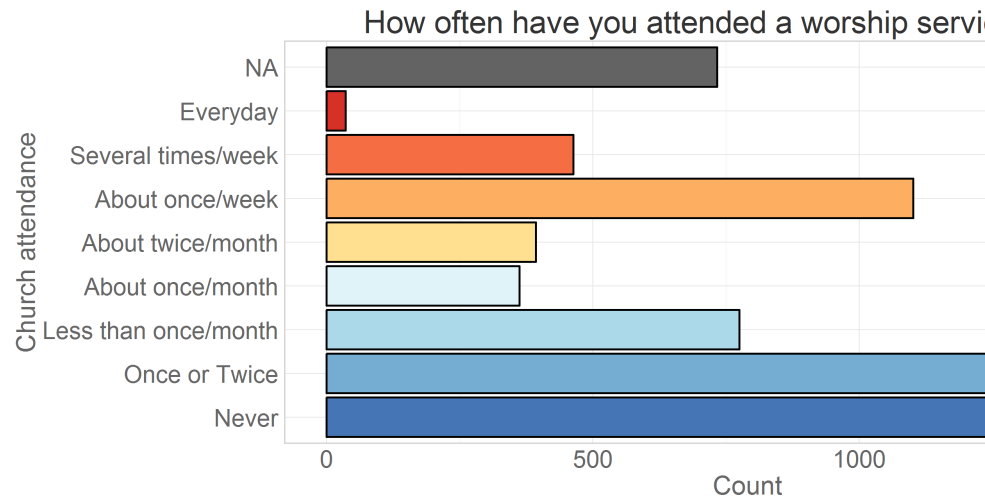
When transforming the metric of time, and using biological age instead of year of measurement as the temporal dimension, the value of age at the time of the interview will be computed as **age = agemon/12**

```
ds<- dsL %>%
  dplyr::filter(id==25, year %in% c(1997:2011)) %>%
  dplyr::select(id,bmonthF,byear,year, agemon,ageyear) %>%
  dplyr::mutate (age = agemon/12)
print(ds)
```

	id	bmonthF	byear	year	agemon	ageyear	age
1	25	Mar	1983	1997	167	13	13.92
2	25	Mar	1983	1998	188	15	15.67
3	25	Mar	1983	1999	201	16	16.75
4	25	Mar	1983	2000	214	17	17.83
5	25	Mar	1983	2001	226	18	18.83
6	25	Mar	1983	2002	236	19	19.67
7	25	Mar	1983	2003	254	21	21.17
8	25	Mar	1983	2004	261	21	21.75
9	25	Mar	1983	2005	272	22	22.67
10	25	Mar	1983	2006	284	23	23.67
11	25	Mar	1983	2007	295	24	24.58
12	25	Mar	1983	2008	307	25	25.58
13	25	Mar	1983	2009	319	26	26.58
14	25	Mar	1983	2010	332	27	27.67
15	25	Mar	1983	2011	342	28	28.50

4 Attendance

NLSY97 asked to report church attendance (**attend**) for the past 12 months preceding the interview date. The response offered a



choice of 7 categories ordered by magnitude.

5 Read more

in ./Models/Descriptives:

- [Metrics][metrics] - how values of items are labeled
- [Descriptives][descriptives] - basic stats of various items (**Continue**)
- [Attendance][attend] - focus on church attendance over time
- [Databox][databox]

See also

- [Deriving Data from NLYS97 extract][derive]
- [Data Manipulation Guide][manipulate]