lm() in mutate()

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Data for a single person

```
ds<- dsL %>% dplyr::filter(id==1,year %in% c(2000:2011)) %>% dplyr::select(id,year,attend) %>%
  mutate(time=year-2000)
print(ds)
```

```
   id year attend time
1   1 2000      1    0
2   1 2001      6    1
3   1 2002      2    2
4   1 2003      1    3
5   1 2004      1    4
6   1 2005      1    5
7   1 2006      1    6
8   1 2007      1    7
9   1 2008      1    8
10  1 2009      1    9
11  1 2010      1   10
12  1 2011      1   11
```

```
ds <- read.table(header = TRUE, text ="
obs  id year attend
1  47 2000      1
2  47 2001      3
3  47 2002      5
4  47 2003      8
5  47 2004      6
6  47 2005      4
7  47 2006      2
8  47 2007      1
9  47 2008      2
10 47 2009      3
11 47 2010      4
12 47 2011      5

")
ds<- ds %>% dplyr::mutate(time=year-2000)
print(ds)
```

```
   obs id year attend time
1    1 47 2000      1    0
2    2 47 2001      3    1
3    3 47 2002      5    2
4    4 47 2003      8    3
5    5 47 2004      6    4
6    6 47 2005      4    5
7    7 47 2006      2    6
```

```
8     8 47 2007       1     7
9     9 47 2008       2     8
10   10 47 2009       3     9
11   11 47 2010       4    10
12   12 47 2011       5    11
```

add a straight line to represent possible predition line, in this case a straight line

```
linear<- predict(lm(attend ~ time, ds))
ds<- ds %>% dplyr::mutate(linear=linear)
print(ds)
```

```
   obs id year attend time linear
1    1 47 2000      1    0  3.821
2    2 47 2001      3    1  3.793
3    3 47 2002      5    2  3.765
4    4 47 2003      8    3  3.737
5    5 47 2004      6    4  3.709
6    6 47 2005      4    5  3.681
7    7 47 2006      2    6  3.653
8    8 47 2007      1    7  3.625
9    9 47 2008      2    8  3.597
10  10 47 2009      3    9  3.569
11  11 47 2010      4   10  3.541
12  12 47 2011      5   11  3.513
```

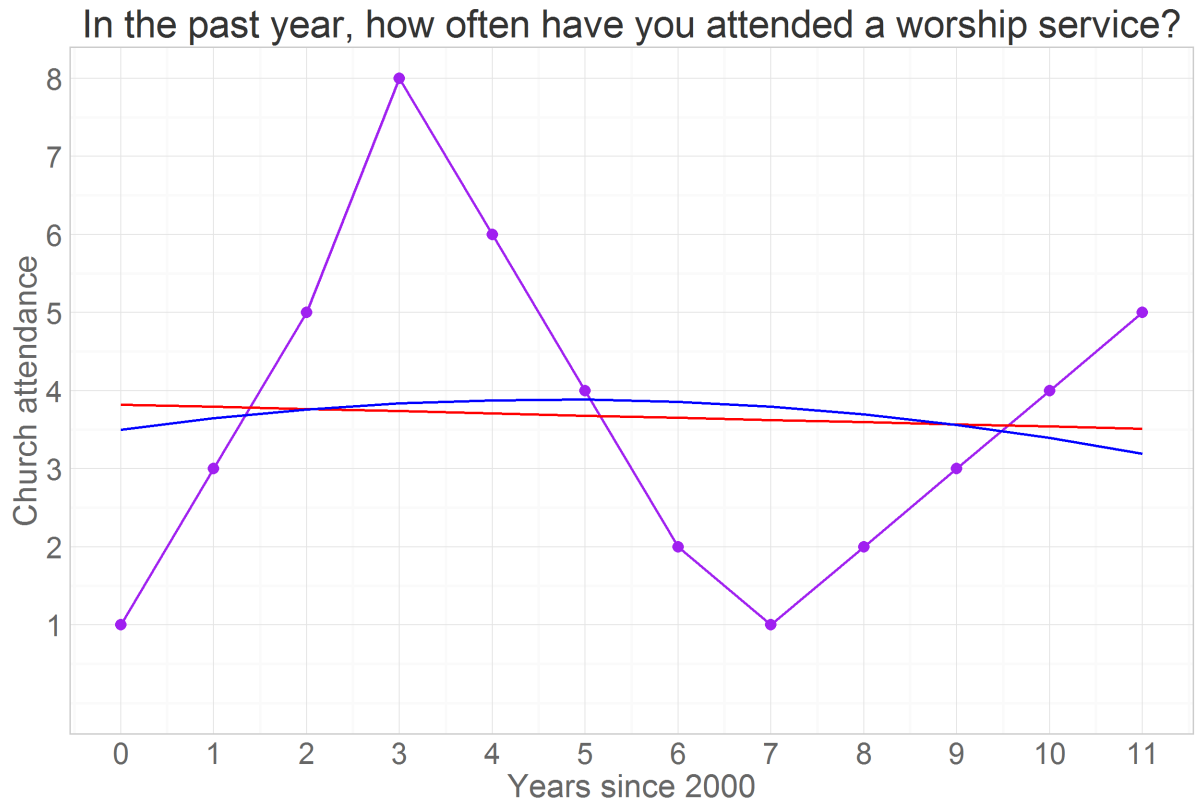
```
p<-p+ geom_line(aes(y=linear),color="red", size=.5)
p
```

Or adding the curvarture the quadratic term

```
quadratic<- predict(lm(attend ~ poly(time,2),ds))
ds<- ds %>% mutate(quadratic=quadratic)
print(ds)
```

```
   obs id year attend time linear quadratic
1    1 47 2000      1    0  3.821     3.500
2    2 47 2001      3    1  3.793     3.647
3    3 47 2002      5    2  3.765     3.759
4    4 47 2003      8    3  3.737     3.836
5    5 47 2004      6    4  3.709     3.878
6    6 47 2005      4    5  3.681     3.885
7    7 47 2006      2    6  3.653     3.857
8    8 47 2007      1    7  3.625     3.794
9    9 47 2008      2    8  3.597     3.696
10  10 47 2009      3    9  3.569     3.563
11  11 47 2010      4   10  3.541     3.395
12  12 47 2011      5   11  3.513     3.192
```

```
p<-p+ geom_line(aes(y=quadratic),color="blue", size=.5)
 p
```



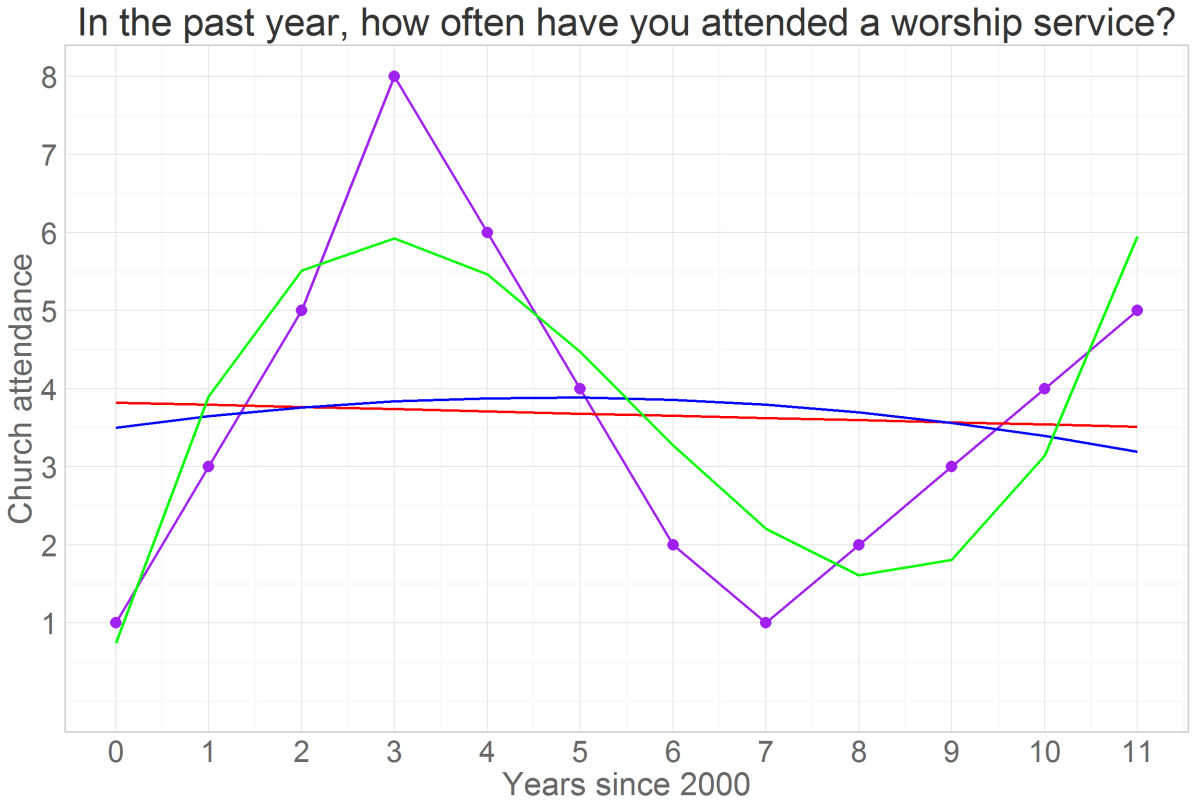

```
# p<-p+ geom_line(aes(y=cubic),color="green", size=.5)
```

or the cubic term

```
cubic<- predict(lm(attend ~ poly(time,3),ds))
ds<- ds %>% mutate( cubic=cubic)
print(ds)
```

```
   obs id year attend time linear quadratic  cubic
1    1 47 2000      1    0  3.821     3.500 0.7436
2    2 47 2001      3    1  3.793     3.647 3.8974
3    3 47 2002      5    2  3.765     3.759 5.5128
4    4 47 2003      8    3  3.737     3.836 5.9239
5    5 47 2004      6    4  3.709     3.878 5.4646
6    6 47 2005      4    5  3.681     3.885 4.4693
7    7 47 2006      2    6  3.653     3.857 3.2720
8    8 47 2007      1    7  3.625     3.794 2.2067
9    9 47 2008      2    8  3.597     3.696 1.6076
10  10 47 2009      3    9  3.569     3.563 1.8089
11  11 47 2010      4   10  3.541     3.395 3.1445
12  12 47 2011      5   11  3.513     3.192 5.9487
```

```
p<-p+ geom_line(aes(y=cubic),color="green", size=.5)
p
```


In the past year, how often have you attended a worship service?
Church attendance
8
7
6
5
4
3
2
1
0
1
2
3
4
5
6
7
8
9
10
11
Years since 2000