

# reFactor

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## 1 Purpose

The function<sup>1</sup> `reFactor` was build mainly to be able to easily rename, reorder, and merge the levels of a factor. It can also create and exclude levels, and set NA to be a level.

Motivating example:

```
lev <- c(" ", "never", "some", "a lot")
smoking <- factor(sample(x=lev, 100, TRUE), levels=lev)
table(smoking)

## smoking
##      never  some a lot
##      27    22   31   20
```

Suppose you would want to clean up the variable `smoking` to have only levels "no" (previously 'never'), "yes" (previously 'some' and 'a lot') and "unknown" (previously ' ') - and in that order.

```
L <- list(never="no", some=c("yes", "a lot"), " " = "unknown")
table(reFactor(smoking, L))
```

---

<sup>1</sup>The name `relevel` was taken!

```
##
##      no      yes unknown
##      22      51      27
```

## 2 Basic functionality

### 2.1 Renaming and reordering levels

Levels can be renamed by providing a list with entries of the old level name that equals a new name.

```
(x <- factor(LETTERS[1:2]))

## [1] A B
## Levels: A B

L <- list(A="newA", B="newB")
reFactor(x,L)

## [1] newA newB
## Levels: newA newB
```

The order of the list determines the order of the levels created.

```
(x <- factor(LETTERS[1:2], levels=LETTERS[2:1]))

## [1] A B
## Levels: B A

L <- list(A="newA", B="newB")
reFactor(x,L)

## [1] newA newB
## Levels: newA newB
```

If you simply want to reorder you must provide a NULL new name.

```
(x <- factor(LETTERS[1:3]))

## [1] A B C
## Levels: A B C

L <- list(B=NULL, A=NULL, C=NULL)
reFactor(x,L)

## [1] A B C
## Levels: B A C
```

The list L need not cover all existing levels. If not, the remaining levels will be added in the same order as they appeared in the original.

```
(x <- factor(LETTERS[1:5]))  
  
## [1] A B C D E  
## Levels: A B C D E  
  
L <- list(D=NULL, B="newB")  
reFactor(x,L)  
  
## [1] A      newB C      D      E  
## Levels: D newB A C E
```

## 2.2 Adding and merging levels

If L includes a non-existing level, this level will be added.

```
(x <- factor(LETTERS[1:2]))  
  
## [1] A B  
## Levels: A B  
  
L <- list(Foo=NULL)  
reFactor(x,L)  
  
## [1] A B  
## Levels: Foo A B
```

There is an option to put these new levels at the end of the levels created.

```
(x <- factor(LETTERS[1:2]))  
  
## [1] A B  
## Levels: A B  
  
L <- list(Foo=NULL, Bar=NULL)  
reFactor(x,L, new.last=TRUE)  
  
## [1] A B  
## Levels: A B Foo Bar
```

If you want to merge two levels this can be achieved by including one in the other, as is best shown by example:

```
(x <- factor(LETTERS[1:3]))

## [1] A B C
## Levels: A B C

L <- list(A="B") # level B to be absorbed by level A
reFactor(x,L)

## [1] A A C
## Levels: A C
```

Note that the above did not rename A as B. The entry A in list L can contain a new name as well as levels to be absorbed. Thus it cannot be renamed as an existing level.

```
(x <- factor(LETTERS[1:3]))

## [1] A B C
## Levels: A B C

L <- list(A=c("merge_AB", "B"))
reFactor(x,L)

## [1] merge_AB merge_AB C
## Levels: merge_AB C
```

The same thing can be achieved by

```
(x <- factor(LETTERS[1:3]))

## [1] A B C
## Levels: A B C

L <- list(B=c("merge_AB", "A"))
reFactor(x,L)

## [1] merge_AB merge_AB C
## Levels: merge_AB C
```

The order of entry B is unimportant, but the first non-level name will be used as a new name.

```
(x <- factor(LETTERS[1:3]))

## [1] A B C
## Levels: A B C
```

```
L <- list(B=c("A", "merger", "new_name"))
reFactor(x,L)

## Warning: [reFactor] Multiple new names for level 'B'. Only the
## first one will be used.

## [1] merger merger C
## Levels: merger C
```

One cannot merge an existing level into more than one place, the first encountered will be used.

```
(x <- factor(LETTERS[1:3]))

## [1] A B C
## Levels: A B C

L <- list(B=c("merge_AB","A"), C=c("new_C", "A"))
reFactor(x,L)

## Warning: [reFactor] Key 'C' has entries used previously. These
## will be skipped

## [1] merge_AB merge_AB new_C
## Levels: merge_AB new_C
```

## 2.3 Excluding and adding NA as level

You can delete levels, i.e. turning it into NA.

```
(x <- factor(LETTERS[1:4]))

## [1] A B C D
## Levels: A B C D

reFactor(x,exclude=c("A","C"))

## [1] <NA> B <NA> D
## Levels: B D
```

You can make NA into a level `missing` by setting `na.level` to any non null value

```
(x <- factor(c(LETTERS[1:2],NA)))

## [1] A B <NA>
## Levels: A B
```

```
reFactor(x,na.level=TRUE)

## [1] A      B      missing
## Levels: A B missing
```

or specify any name by setting `na.level` to a string

```
(x <- factor(c(LETTERS[1:2],NA)))

## [1] A      B      <NA>
## Levels: A B

reFactor(x,na.level="saknas")

## [1] A      B      saknas
## Levels: A B saknas
```

### 3 Order of operations

The function operates in the following order:

- if wanted, turn NA into a level
- if wanted, turn certain levels into NA
- if wanted, rename and reorder levels

Thus you can delete levels whilst making original NA into a new level.

```
(x <- factor(c(LETTERS[1:2],NA)))

## [1] A      B      <NA>
## Levels: A B

reFactor(x, exclude="A", na.level=TRUE)

## [1] <NA>      B      missing
## Levels: B missing
```

But would you want to consider both A and NA as `missing` you would have to 'rename' NA and let that name be absorbed by A which takes the new name 'missing'.

```
(x <- factor(c(LETTERS[1:2],NA)))

## [1] A      B      <NA>
## Levels: A B
```

```
L <- list(A=c("missing", "NA_name"))
reFactor(x, L, na.level="NA_name")

## [1] missing B      missing
## Levels: missing B
```