Generalized Pairwise Comparison - bias correction (example)

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Load package

```
library(BuyseTest) # BuyseTest version 1.3
```

Load data

```
df <- data.frame("survie" = c(2.1, 4.1, 6.1, 8.1, 4, 6, 8, 10),
         "event" = c(1, 1, 1, 0, 1, 0, 0, 1),
         "group" = c(0, 0, 0, 0, 1, 1, 1, 1))
df
```

```
  survie event group
1    2.1     1     0
2    4.1     1     0
3    6.1     1     0
4    8.1     0     0
5    4.0     1     1
6    6.0     0     1
7    8.0     0     1
8   10.0     1     1
```

Default options:

```
BuyseTest.options(method = "Peron", method.inference = "none")
```

1 No correction

Run GPC:

```
BT_Peron <- BuyseTest(group ~ tte(survie, censoring = event, threshold = 1),
              data = df)
```

```
Settings (punctual estimation)
   > reference: Control = 0 and Treatment = 1
   > 1 endpoint:
      |priority endpoint type          operator            threshold censoring |
      |1        survie   time to event higher is favorable 1         event     |
   > management of neutral pairs : re-analyzed using endpoints of lower priority (if any)
   > management of censored survival pairs : imputation using different survival curve for control and treatmen
Punctual estimation (done)
```

Display results (percentage):

```
summary(BT_Peron)
```

```
      Generalized pairwise comparison with 1 prioritized endpoint

> statistic       : net chance of a better outcome (delta: endpoint specific, Delta: global)
> null hypothesis : Delta == 0
> groups          : 0 (control) vs. 1 (treatment)
> results
endpoint threshold total favorable unfavorable neutral uninf delta Delta
  survie         1   100      62.5        12.5    6.25 18.75   0.5   0.5
```

Display results (number of pairs):

```
summary(BT_Peron, percentage = FALSE)
```

```
      Generalized pairwise comparison with 1 prioritized endpoint

> statistic       : net chance of a better outcome (delta: endpoint specific, Delta: global)
> null hypothesis : Delta == 0
> groups          : 0 (control) vs. 1 (treatment)
> results
endpoint threshold total favorable unfavorable neutral uninf delta Delta
  survie         1    16        10           2       1     3   0.5   0.5
```

2 Manual correction:

```
table <- summary(BT_Peron, percentage = FALSE, show = FALSE)$table
vec.count <- table[table$strata == "global",
           c("n.favorable","n.unfavorable","n.neutral","n.uninf")]
vec.count
```

```
  n.favorable n.unfavorable n.neutral n.uninf
1          10             2         1       3
```

Multiplicative factor:

```
factor <- sum(vec.count)/as.double(sum(vec.count)-vec.count["n.uninf"])
factor
```

```
[1] 1.230769
```

Corrected output (number of pairs):

```
vec.count2 <- vec.count[1:3]*factor
vec.count2
```

```
  n.favorable n.unfavorable n.neutral
1    12.30769      2.461538  1.230769
```

Corrected output (percentage of pairs):

```
vec.count2/sum(vec.count)
```

```
  n.favorable n.unfavorable  n.neutral
1   0.7692308     0.1538462 0.07692308
```

3 Automatic correction

Run GPC with correction (argument `correctionTTE`)

```
BT_PeronC <- BuyseTest(group ~ tte(survie, censoring = event, threshold = 1),
                correctionTTE = TRUE,
                data = df)
```

```
Settings (punctual estimation)
   > reference: Control = 0 and Treatment = 1
   > 1 endpoint:
      |priority endpoint type          operator            threshold censoring |
      |1        survie   time to event higher is favorable 1         event     |
   > management of neutral pairs : re-analyzed using endpoints of lower priority (if any)
   > management of censored survival pairs : imputation using different survival curve for control and treatmen
Punctual estimation (done)
```

Display results (percentage):

```
summary(BT_PeronC)
```

```
       Generalized pairwise comparison with 1 prioritized endpoint

> statistic       : net chance of a better outcome (delta: endpoint specific, Delta: global)
> null hypothesis : Delta == 0
> groups          : 0 (control) vs. 1 (treatment)
> results
endpoint threshold total favorable unfavorable neutral uninf delta Delta
  survie         1   100     76.92       15.38    7.69     0 0.615 0.615
```

Display results (number of pairs):

```
summary(BT_PeronC, percentage = FALSE)
```

```
       Generalized pairwise comparison with 1 prioritized endpoint

> statistic       : net chance of a better outcome (delta: endpoint specific, Delta: global)
> null hypothesis : Delta == 0
> groups          : 0 (control) vs. 1 (treatment)
> results
endpoint threshold total favorable unfavorable neutral uninf delta Delta
  survie         1    16     12.31        2.46    1.23     0 0.615 0.615
```