Package ‘GEEmediate’

July 18, 2019

Title Mediation Analysis for Generalized Linear Models Using the Difference Method

Description Causal mediation analysis for a single exposure/treatment and a single mediator, both allowed to be either continuous or binary. The package implements the difference method and provide point and interval estimates as well as testing for the natural direct and indirect effects and the mediation proportion. Nevo, Xiao and Spiegelman (2019) <doi:10.1515/ijb-2017-0006>.

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Depends R (>= 3.3.0)

Imports gee

License GPL (>= 3)

NeedsCompilation no

LazyData true

RoxygenNote 6.1.0

BugReports https://github.com/daniel258/GEEMediate/issues

Encoding UTF-8

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Description

Estimation of natural direct and indirect effects for generalized linear models. The function utilizes a data-duplication algorithm to fit marginal and conditional GLMs in a way that allow for consistent variance estimation. The function produces point estimates, confidence intervals and p-values for the natural indirect effect and the mediation proportion.

Usage

GEEmediate(formula, exposure, mediator, df, family = gaussian, corstr = "independence", conf.level = 0.95, surv = F, pres = "sep", niealternative = "two-sided", ...)

Arguments

- formula: A formula expression as for other regression models, of the form response ~ predictors. See the documentation of lm and formula for details. predictors should include exposure/treatment and mediator.
- exposure: The exposure (string).
- mediator: The mediator (string).
- df: A name of a data frame where all variables mentioned in formula are stored.
- family: A family object to be used in gee: a list of functions and expressions for defining link and variance functions see the gee documentation. Default is gaussian. See also gee and glm.
- corstr: A working correlation structure. See gee and glm.
- conf.level: Confidence level for all confidence intervals (default 0.95)
- surv: Is the outcome survival (not supported)
- pres: Presentation of the coefficient tables. "tog" for a single table, "sep" for two separated tables.
- niealternative: Alternative hypothesis for testing that the nie=0. Either "two-sided" (default) or "one-sided" for alternative nie>0.
- ... Further arguments for the gee call.

Value

The output contains the following components:

- call: The call.
- GEE.fit: Results of fitting the GEE for the duplicated data.
nie The natural indirect effect estimate. NIE and NDE are reported on the coefficient scale
nie.pval P-value for testing mediation using the NIE.
nde The natural direct effect estimate.
nie.ci Confidence interval in for the NIE in confidence level conf.level.
pm The mediation proportion estimate.
pm.pval P-value for testing one-sided mediation using the mediation proportion.
pm.ci Confidence interval for the mediation proportion in confidence level conf.level.

References

Examples
```r
## Not run:
SimNormalData <- function(n,beta1.star = 1, p = 0.3, rho =0.4, inter = 0) {
  beta2 <- (p/rho)*beta1.star
  beta1 <- (1-p)*beta1.star
  XM <- MASS::mvrnorm(n, mu = c(0,0), Sigma = matrix(c(1,rho,rho,1),2,2))
  X <- XM[,1]
  M <- XM[,2]
  beta <- c(inter, beta1, beta2)
  print(beta)
  Y <- cbind(rep(1,n),XM) %*% beta + rnorm(n,0,sd = 1)
  return(data.frame(X = X, M = M, Y = Y))
}
set.seed(314)
df <- SimNormalData(500)
GEEmediate(Y ~ X + M, exposure = "X", mediator = "M", df = df)
```
## End(Not run)