Variable categórica

CEPAL

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Lectura de la base

```
encuesta <- readRDS("../Data/encuesta.rds")
```

Definir diseño de la muestra con `srvyr`

```
library(srvyr)

diseno <- encuesta %>%
  as_survey_design(
    strata = Stratum,
    ids = PSU,
    weights = wk,
    nest = T
  )
```

definir nuevas variables

```
diseno <- diseno %>% mutate(
  pobreza = ifelse(Poverty != "NotPoor", 1, 0),
  desempleo = ifelse(Employment == "Unemployed", 1, 0),
  edad_18 = case_when(Age < 18 ~ "< 18 años",
                      TRUE ~ ">= 18 años")
)
```

Sub-grupos

Extraer sub-grupos de la encuesta.

```
sub_Urbano <- diseno %>%  filter(Zone == "Urban")
sub_Rural  <- diseno %>%  filter(Zone == "Rural")
sub_Mujer  <- diseno %>%  filter(Sex == "Female")
sub_Hombre <- diseno %>%  filter(Sex == "Male")
```

Estimación de tamaño

```
(tamano_zona <- diseno %>% group_by(Zone) %>%
   summarise(
     n = unweighted(n()),
     Nd = survey_total(vartype = c("se","ci"))))
```

Zone	n	Nd	Nd_se	Nd_low	Nd_upp
Rural	1265	72102	3053	66057	78147
Urban	1332	78164	2112	73982	82346

Estimación de tamaño

```
(tamano_pobreza <- diseno %>% group_by(Poverty) %>%
   summarise(
       Nd = survey_total(vartype = c("se","ci"))))
```

Poverty	Nd	Nd_se	Nd_low	Nd_upp
NotPoor	90321	3930	82538	98103
Extreme	11961	2379	7250	16672
Relative	47985	5225	37639	58330

Estimación de tamaño

```
(tamano_pobreza <- diseno %>%
   group_by(pobreza) %>%
   summarise(
       Nd = survey_total(vartype = c("se","ci"))))
```

pobreza	Nd	Nd_se	Nd_low	Nd_upp
0	90321	3930	82538	98103
1	59945	4819	50404	69487

Estimación de tamaño

```
(tamano_ocupacion <- diseno %>%
   group_by(Employment) %>%
   summarise(
       Nd = survey_total(vartype = c("se","ci"))))
```

Employment	Nd	Nd_se	Nd_low	Nd_upp
Unemployed	5326	798.4	3745	6907
Inactive	43436	2023.9	39428	47443
Employed	61474	2078.2	57359	65589
NA	40030	2239.1	35596	44464

Estimación de tamaño

```
(tamano_ocupacion_pobreza <- diseno %>%
   group_by(Employment, Poverty) %>%
   cascade(
       Nd = survey_total(vartype = c("se","ci")),
       .fill = "Total") %>%
   data.frame()
   )
```

Estimación de tamaño

Employment	Poverty	Nd	Nd_se	Nd_low	Nd_upp
Unemployed	NotPoor	2312	453.4	1414.4	3210
Unemployed	Extreme	1142	456.7	237.7	2046
Unemployed	Relative	1872	450.6	979.4	2764
Unemployed	Total	5326	798.4	3744.8	6907
Inactive	NotPoor	24623	1284.4	22079.2	27166
Inactive	Extreme	3950	1033.4	1903.5	5996
Inactive	Relative	14864	1858.6	11183.4	18544
Inactive	Total	43436	2023.9	39428.4	47443
Employed	NotPoor	43489	2063.2	39403.4	47574
Employed	Extreme	2470	500.8	1477.8	3461
Employed	Relative	15516	1714.9	12120.3	18912
Employed	Total	61474	2078.2	57359.0	65589
Total	Total	150266	3712.1	142915.7	157616
NA	NotPoor	19897	1620.4	16688.7	23106
NA	Extreme	4400	993.6	2432.1	6367
NA	Relative	15733	2310.9	11157.6	20309
NA	Total	40030	2239.1	35596.5	44464

Estimación de proporción de urbano y rural

```
(prop_zona <- diseno %>% group_by(Zone) %>%
   summarise(
     prop = survey_mean(vartype = c("se","ci"),
                        proportion = TRUE )))
```

Zone	prop	prop_se	prop_low	prop_upp
Rural	0.4798	0.0125	0.4551	0.5047
Urban	0.5202	0.0125	0.4953	0.5449

```
(prop_zona2 <- diseno %>% group_by(Zone) %>%
   summarise(
     prop = survey_prop(vartype = c("se","ci") )))
```

Zone	prop	prop_se	prop_low	prop_upp
Rural	0.4798	0.0125	0.4550	0.5047
Urban	0.5202	0.0125	0.4953	0.5450

Poporsión de hombres y mujeres en la zona urbana y rural

```
(prop_sexoU <- sub_Urbano %>% group_by(Sex) %>%
   summarise(
     n = unweighted(n()),
     prop = survey_prop(vartype = c("se","ci"))))
```

Sex	n	prop	prop_se	prop_low	prop_upp
Female	718	0.5367	0.0119	0.5128	0.5606
Male	614	0.4633	0.0119	0.4394	0.4872

```
(prop_sexoR <- sub_Rural %>% group_by(Sex) %>%
   summarise(
     n = unweighted(n()),
     prop = survey_prop(vartype = c("se","ci"))))
```

Sex	n	prop	prop_se	prop_low	prop_upp
Female	633	0.5165	0.0153	0.4858	0.5471
Male	632	0.4835	0.0153	0.4529	0.5142

Poporsión de hombres en la zona urbana y rural

```
(prop_ZonaH <- sub_Hombre %>% group_by(Zone) %>%
   summarise(
     prop = survey_prop(vartype = c("se","ci"))))
```

Zone	prop	prop_se	prop_low	prop_upp
Rural	0.4905	0.0149	0.461	0.520
Urban	0.5095	0.0149	0.480	0.539

Poporsión de mujeres en la zona urbana y rural

```
(prop_ZonaM <- sub_Mujer %>% group_by(Zone) %>%
   summarise(
    prop = survey_prop(vartype = c("se","ci"))))
```

Zone	prop	prop_se	prop_low	prop_upp
Rural	0.4702	0.0167	0.4372	0.5033
Urban	0.5298	0.0167	0.4967	0.5628

Poporsión de hombres en la zona urbana y rural

```
(prop_ZonaH_Pobreza <- sub_Hombre %>%
   group_by(Zone, Poverty) %>%
   summarise(
     prop = survey_prop(vartype = c("se","ci")))%>%
   data.frame())
```

Zone	Poverty	prop	prop_se	prop_low	prop_upp
Rural	NotPoor	0.5686	0.0486	0.4723	0.6649
Rural	Extreme	0.0925	0.0332	0.0267	0.1582
Rural	Relative	0.3389	0.0560	0.2279	0.4499
Urban	NotPoor	0.6209	0.0247	0.5719	0.6699
Urban	Extreme	0.0735	0.0183	0.0371	0.1098
Urban	Relative	0.3056	0.0302	0.2458	0.3654

Poporsión de mujeres en la zona urbana y rural

```
(prop_ZonaM_Pobreza <- sub_Mujer %>%
   group_by(Zone, Poverty) %>%
   summarise(
     prop = survey_prop(vartype = c("se","ci"))) %>%
   data.frame())
```

Zone	Poverty	prop	prop_se	prop_low	prop_upp
Rural	NotPoor	0.5895	0.0529	0.4847	0.6943
Rural	Extreme	0.0825	0.0272	0.0288	0.1363
Rural	Relative	0.3280	0.0584	0.2123	0.4437
Urban	NotPoor	0.6212	0.0322	0.5574	0.6850
Urban	Extreme	0.0716	0.0161	0.0397	0.1036
Urban	Relative	0.3072	0.0326	0.2427	0.3717

Poporsión de hombres en la zona y empleado

```
(prop_ZonaH_Ocupacion <- sub_Hombre %>%
   group_by(Zone, Employment) %>%
   summarise(
     prop = survey_prop(vartype = c("se","ci")))%>%
   data.frame())
```

Zone	Employment	prop	prop_se	prop_low	prop_upp
Rural	Unemployed	0.0616	0.0159	0.0301	0.0932
Rural	Inactive	0.1214	0.0166	0.0885	0.1543
Rural	Employed	0.4833	0.0222	0.4393	0.5273
Rural	NA	0.3337	0.0224	0.2894	0.3780
Urban	Unemployed	0.0400	0.0097	0.0208	0.0593
Urban	Inactive	0.1629	0.0143	0.1345	0.1912
Urban	Employed	0.5289	0.0202	0.4889	0.5689
Urban	NA	0.2682	0.0182	0.2322	0.3041

Poporsión de mujeres en la zona urbana y rural

```
(prop_ZonaM_Ocupacion <- sub_Mujer %>%
   group_by(Zone, Employment) %>%
   summarise(
     prop = survey_prop(vartype = c("se","ci"))) %>%
   data.frame())
```

Zone	Employment	prop	prop_se	prop_low	prop_upp
Rural	Unemployed	0.0128	0.0056	0.0017	0.0239
Rural	Inactive	0.5066	0.0216	0.4637	0.5494
Rural	Employed	0.2306	0.0260	0.1790	0.2821
Rural	NA	0.2501	0.0239	0.2028	0.2974
Urban	Unemployed	0.0298	0.0074	0.0151	0.0445
Urban	Inactive	0.3443	0.0191	0.3065	0.3821
Urban	Employed	0.4025	0.0174	0.3680	0.4369
Urban	NA	0.2234	0.0157	0.1924	0.2545

Estimación de la proporción de personas menor a 18 años

```
diseno %>%
group_by(edad_18, pobreza) %>%
  summarise(
    Prop = survey_prop(vartype =  c("se", "ci"))) %>%
  data.frame()
```

Estimación de la proporción de personas menor a 18 años

edad_18	pobreza	Prop	Prop_se	Prop_low	Prop_upp
$<$ 18 años	0	0.5134	0.0403	0.4336	0.5931
$<$ 18 años	1	0.4866	0.0403	0.4069	0.5664
$>=$ 18 años	0	0.6430	0.0243	0.5950	0.6911
$>=$ 18 años	1	0.3570	0.0243	0.3089	0.4050

Estimación de la proporción de personas menor a 18 años

```
diseno %>%
  group_by(edad_18, desempleo) %>%
  summarise(
    Prop = survey_prop(vartype =  c("se", "ci"))) %>%
  data.frame()
```

Estimación de la proporción de personas menor a 18 años

edad_18	desempleo	Prop	Prop_se	Prop_low	Prop_upp
< 18 años	0	0.1759	0.0144	0.1474	0.2044
< 18 años	1	0.0009	0.0009	-0.0009	0.0027
< 18 años	NA	0.8232	0.0145	0.7945	0.8518
>= 18 años	0	0.9480	0.0075	0.9332	0.9629
>= 18 años	1	0.0520	0.0075	0.0371	0.0668

Estimación de la proporción de personas menor a 18 años en zona rural

```
sub_Rural %>%
  group_by(edad_18) %>%
  summarise(
    Prop = survey_prop(vartype =  c("se", "ci"))) %>%
  data.frame()
```

edad_18	Prop	Prop_se	Prop_low	Prop_upp
< 18 años	0.3558	0.0201	0.3156	0.3960
>= 18 años	0.6442	0.0201	0.6040	0.6844

Estimación de la proporción de mujeres rango de edad

```
sub_Mujer %>% mutate(edad_rango = case_when(
  Age>= 18 & Age <=35  ~ "18 - 35",
  TRUE ~ "Otro")) %>%
  group_by(edad_rango, Employment) %>%
  summarise(
    Prop = survey_prop(vartype =  c("se", "ci"))) %>%
  data.frame()
```

edad_rango	Employment	Prop	Prop_se	Prop_low	Prop_upp
18 - 35	Unemployed	0.0589	0.0134	0.0323	0.0855
18 - 35	Inactive	0.5047	0.0304	0.4445	0.5649
18 - 35	Employed	0.4364	0.0295	0.3780	0.4948
Otro	Unemployed	0.0055	0.0028	-0.0001	0.0110
Otro	Inactive	0.3835	0.0155	0.3528	0.4142
Otro	Employed	0.2711	0.0178	0.2359	0.3063
Otro	NA	0.3399	0.0187	0.3029	0.3769

Estimación de la proporción de hombres rango de edad

```
sub_Hombre %>% mutate(edad_rango = case_when(
  Age>= 18 & Age <=35  ~ "18 - 35",
  TRUE ~ "Otro")) %>%
  group_by(edad_rango, Employment) %>%
  summarise(
    Prop = survey_prop(vartype =  c("se", "ci"))) %>%
  data.frame()
```

edad_rango	Employment	Prop	Prop_se	Prop_low	Prop_upp
18 - 35	Unemployed	0.1012	0.0197	0.0623	0.1402
18 - 35	Inactive	0.1589	0.0240	0.1114	0.2065
18 - 35	Employed	0.7398	0.0306	0.6791	0.8005
Otro	Unemployed	0.0317	0.0077	0.0164	0.0470
Otro	Inactive	0.1364	0.0133	0.1100	0.1628
Otro	Employed	0.4194	0.0177	0.3844	0.4544
Otro	NA	0.4125	0.0181	0.3767	0.4483

Tabla Zona Vs Sexo

```
(
  prop_sexo_zona <- diseno %>%
    group_by(Sex, Zone, pobreza) %>%
    summarise(
      prop = survey_prop(vartype = c("se", "ci"))) %>%
    data.frame()
)
```

Tabla Zona Vs Sexo

Sex	Zone	pobreza	prop	prop_se	prop_low	prop_upp
Female	Rural	0	0.5895	0.0529	0.4847	0.6943
Female	Rural	1	0.4105	0.0529	0.3057	0.5153
Female	Urban	0	0.6212	0.0322	0.5574	0.6850
Female	Urban	1	0.3788	0.0322	0.3150	0.4426
Male	Rural	0	0.5686	0.0486	0.4724	0.6649
Male	Rural	1	0.4314	0.0486	0.3351	0.5276
Male	Urban	0	0.6209	0.0247	0.5720	0.6699
Male	Urban	1	0.3791	0.0247	0.3301	0.4280

Tablas de doble entrada.

```
tab_Sex_Pobr <- svyby(~Sex,  ~pobreza, diseno, svymean)
tab_Sex_Pobr %>% select(-se.SexFemale, -se.SexMale)
```

	pobreza	SexFemale	SexMale
0	0	0.5316	0.4684
1	1	0.5201	0.4799

```
tab_Sex_Pobr %>% select(-SexFemale, -SexMale)
```

	pobreza	se.SexFemale	se.SexMale
0	0	0.0097	0.0097
1	1	0.0178	0.0178

Tablas de doble entrada.

```
confint(tab_Sex_Pobr) %>% as.data.frame()
```

	2.5 %	97.5 %
0:SexFemale	0.5126	0.5505
1:SexFemale	0.4853	0.5550
0:SexMale	0.4495	0.4874
1:SexMale	0.4450	0.5147

Prueba de independencia.

```
svychisq(~Sex + pobreza, diseno, statistic="F")
```

```
##
##  Pearson's X^2: Rao & Scott adjustment
##
## data:  NextMethod()
## F = 0.35, ndf = 1, ddf = 119, p-value = 0.6
```

Tablas de doble entrada.

```
tab_Sex_Ocupa <- svyby(~Sex,  ~Employment, diseno, svymean)
tab_Sex_Ocupa %>% select(-se.SexFemale, -se.SexMale)
```

	Employment	SexFemale	SexMale
Unemployed	Unemployed	0.3242	0.6758
Inactive	Inactive	0.7668	0.2332
Employed	Employed	0.4143	0.5857

```
tab_Sex_Ocupa %>% select(-SexFemale, -SexMale)
```

	Employment	se.SexFemale	se.SexMale
Unemployed	Unemployed	0.0557	0.0557
Inactive	Inactive	0.0135	0.0135
Employed	Employed	0.0128	0.0128

Tablas de doble entrada

```
confint(tab_Sex_Ocupa) %>% as.data.frame()
```

	2.5 %	97.5 %
Unemployed:SexFemale	0.2151	0.4334
Inactive:SexFemale	0.7404	0.7932
Employed:SexFemale	0.3892	0.4395
Unemployed:SexMale	0.5666	0.7849
Inactive:SexMale	0.2068	0.2596
Employed:SexMale	0.5605	0.6108

Prueba de independencia.

```
svychisq(~Sex + Employment,
         design = diseno,  statistic="F")
```

```
##
##  Pearson's X^2: Rao & Scott adjustment
##
## data:  NextMethod()
## F = 106, ndf = 2, ddf = 235, p-value <2e-16
```

Tablas de doble entrada.

```
tab_region_pobreza <-
  svyby(~as.factor(pobreza),  ~Region, diseno, svymean)
tab_region_pobreza %>%
  select(-"se.as.factor(pobreza)0",
         -"se.as.factor(pobreza)1")
```

	Region	as.factor(pobreza)0	as.factor(pobreza)1
Norte	Norte	0.5787	0.4213
Sur	Sur	0.6921	0.3079
Centro	Centro	0.7491	0.2509
Occidente	Occidente	0.6020	0.3980
Oriente	Oriente	0.4547	0.5453

Tablas de doble entrada.

```
tab_region_pobreza %>%
 select("se.as.factor(pobreza)0",
        "se.as.factor(pobreza)1")
```

	se.as.factor(pobreza)0	se.as.factor(pobreza)1
Norte	0.0522	0.0522
Sur	0.0539	0.0539
Centro	0.0460	0.0460
Occidente	0.0385	0.0385
Oriente	0.0767	0.0767

Prueba de independencia.

```
svychisq(~Region + pobreza,
         design = diseno,  statistic="F")
```

```
##
##  Pearson's X^2: Rao & Scott adjustment
##
## data:  NextMethod()
## F = 4.2, ndf = 3.2, ddf = 380.1, p-value = 0.005
```

Razón de obbs

```
(tab_Sex <- svyby(~pobreza,  ~Sex, diseno,
                  svymean, vartype = c("se", "ci")))
```

	Sex	pobreza	se	ci_l	ci_u
Female	Female	0.3937	0.0304	0.3342	0.4533
Male	Male	0.4047	0.0270	0.3518	0.4576

```
svycontrast(tab_Sex, quote(`Female`/`Male`)  )
```

```
##          nlcon  SE
## contrast 0.973 0.1
```

Razón de obbs

```
tab_Sex_Pobr <-
   svymean(~interaction (Sex, pobreza), diseno,
               se=T, na.rm=T, ci=T, keep.vars=T)
  tab_Sex_Pobr %>%  as.data.frame()
```

	mean	SE
interaction(Sex, pobreza)Female.0	0.3195	0.0151
interaction(Sex, pobreza)Male.0	0.2816	0.0145
interaction(Sex, pobreza)Female.1	0.2075	0.0176
interaction(Sex, pobreza)Male.1	0.1914	0.0130

Razón de obbs

```
svycontrast(tab_Sex_Pobr,
            quote((`interaction(Sex, pobreza)Female.0`/
                     `interaction(Sex, pobreza)Female.1`)/
                  (`interaction(Sex, pobreza)Male.0`/
                     `interaction(Sex, pobreza)Male.1`) ))
```

```
##           nlcon   SE
## contrast  1.05 0.08
```

Razón de obbs

$$\frac{\frac{P(Sex{=}Male|pobreza{=}1)}{P(Sex{=}Female|pobreza{=}1)}}{\frac{P(Sex{=}Male|pobreza{=}0)}{P(Sex{=}Female|pobreza{=}0)}}$$

```
svycontrast(tab_Sex_Pobr,
            quote((`interaction(Sex, pobreza)Male.1`/
                     `interaction(Sex, pobreza)Female.1`)/
                  (`interaction(Sex, pobreza)Male.0`/
                   `interaction(Sex, pobreza)Female.0`)))
```

```
##          nlcon   SE
## contrast  1.05 0.08
```

Contrastes

```
(tab_sex_pobreza <- svyby(~pobreza, ~Sex,
                          diseno ,
                        svymean, na.rm=T, covmat = TRUE,
                        vartype = c("se", "ci")))
```

	Sex	pobreza	se	ci_l	ci_u
Female	Female	0.3937	0.0304	0.3342	0.4533
Male	Male	0.4047	0.0270	0.3518	0.4576

```
# Paso 1: diferencia de estimaciones
0.3937        - 0.4047
```

```
## [1] -0.011
```

contrastes

```
# Paso 2: error estándar de la diferencia
vcov(tab_sex_pobreza)
```

	Female	Male
Female	9e-04	7e-04
Male	7e-04	7e-04

```
sqrt(0.0009227 + 0.0007294 - 2*0.0006551)
```

```
## [1] 0.01849
```

contrastes

```
svycontrast(tab_sex_pobreza,
            list(diff_Sex = c(1, -1))) %>%
  data.frame()
```

	contrast	diff_Sex
diff_Sex	-0.011	0.0185

Contrastes

```
(tab_sex_desempleo <- svyby(~desempleo, ~Sex,
                            diseno %>% filter(!is.na(desemple
                            svymean, na.rm=T, covmat = TRUE,
                            vartype = c("se", "ci")))
```

	Sex	desempleo	se	ci_l	ci_u
Female	Female	0.0285	0.0061	0.0166	0.0405
Male	Male	0.0724	0.0125	0.0479	0.0968

```
# diferencia de estimaciones
0.07237 - 0.02854
```

```
## [1] 0.04383
```

Contrastes

```
vcov(tab_sex_desempleo)
```

	Female	Male
Female	0	0e+00
Male	0	2e-04

```
sqrt(0.000037026 + 0.00015547 - 2*0.000013369)
```

```
## [1] 0.01287
```

```
svycontrast(tab_sex_desempleo,
            list(diff_Sex = c(-1, 1))) %>%
  data.frame()
```

	contrast	diff_Sex
diff_Sex	0.0438	0.0129

Contrastes no independiente

```
(prom_sexo <- svyby(~Income, ~Sex, diseno,
                    svymean, na.rm=T,covmat = TRUE,
                    vartype = c("se", "ci")))
```

	Sex	Income	se	ci_l	ci_u
Female	Female	523.7	18.38	487.7	559.7
Male	Male	534.8	17.36	500.8	568.9

Contrastes no independiente

```
svycontrast(prom_sexo, list(diff_Sexo = c(1, -1))) %>%
  data.frame()
```

	contrast	diff_Sexo
diff_Sexo	-11.15	14.4

Contrastes no independiente

```
vcov(prom_sexo)
```

	Female	Male
Female	337.7	215.8
Male	215.8	301.2

```
# Note que el error estandar  de la diferencia es igual a
sqrt(582 + 733 - 2*449)
```

```
## [1] 20.42
```

Contrastes no independiente

```
(sum_region <- svyby( ~ Income,  ~ Region,
                      diseno, svytotal, na.rm = T,
                      covmat = TRUE,
                      vartype = c("se", "ci")))
```

	Region	Income	se	ci_l	ci_u
Norte	Norte	11590412	885806	9854263	13326561
Sur	Sur	16184792	1491038	13262411	19107172
Centro	Centro	16698347	1545028	13670147	19726546
Occidente	Occidente	18261033	1861150	14613245	21908821
Oriente	Oriente	16749559	1457298	13893307	19605811

Contrastes no independiente

```
svycontrast(sum_region,
            list(
              Agregado_NCS = c(1, 1, 1, 0, 0)
              )) %>% data.frame()
```

	contrast	Agregado_NCS
Agregado_NCS	44473550	2322705

```
# Note que el error estandar  de la diferencia es igual a
sqrt(582 + 733 - 2*449)
```

```
## [1] 20.42
```

Contrastes

```
vcov(sum_region)
```

	Norte	Sur	Centro	Occidente	Orie
Norte	7.847e+11	0.000e+00	0.000e+00	0.000e+00	0.000e-
Sur	0.000e+00	2.223e+12	0.000e+00	0.000e+00	0.000e-
Centro	0.000e+00	0.000e+00	2.387e+12	0.000e+00	0.000e-
Occidente	0.000e+00	0.000e+00	0.000e+00	3.464e+12	0.000e-
Oriente	0.000e+00	0.000e+00	0.000e+00	0.000e+00	2.124e-

```
sqrt(2805154074898 + 3839259031856 + 7559032807016 )
```

```
## [1] 3768746
```

Contrastes no independiente

```
(prom_edad <- svyby(~Income, ~CatAge, diseno, svymean, na.r
```

	CatAge	Income	se
0-5	0-5	471.6	25.22
6-15	6-15	484.3	27.58
16-30	16-30	563.4	19.52
31-45	31-45	543.6	28.68
46-60	46-60	563.9	25.02
Más de 60	Más de 60	507.6	36.56

```
svycontrast(prom_edad,
            list(
              agregado_edad = c(1/6, 1/6, 1/6, 1/6, 1/6, 1/
              )) %>% data.frame()
```

	contrast	agregado_edad
agregado_edad	522.4	16.21

Contrastes no independiente

```
vcov(prom_edad)
```

	0-5	6-15	16-30	31-45	46-60	Más de 60
0-5	635.81	374.4	95.03	297.257	-61.797	-158.7
6-15	374.40	760.8	100.40	416.318	105.266	160.7
16-30	95.03	100.4	381.15	78.715	173.719	205.1
31-45	297.26	416.3	78.71	822.340	-2.577	458.8
46-60	-61.80	105.3	173.72	-2.577	626.039	208.2
Más de 60	-158.65	160.7	205.10	458.838	208.174	1336.8

```
(1/6)*sqrt(4888 + 646 + 1611 + 2197 + 1181 + 5553
       + 2*22 + 2*(-1289) + 2*864 + 2*(-1387) + 2*189 +
       2*454 + 2*441 + 2*347 + 2*856 +
       2*290 + 2*820 + 2*1337+
       2*103 + 2*488 +
       2*268)
```

```
## [1] 25.65
```

Contrastes no independiente

```
(razon_sexo <- svyby(~Income, ~Sex, denominator = ~Expendit
                     diseno, svyratio, na.rm=T, covmat = TR
```

	Sex	Income/Expenditure	se.Income/Expenditure	ci_l
Female	Female	1.467	0.0383	1.392
Male	Male	1.478	0.0418	1.396

```
svycontrast(razon_sexo,
            list(
              diff_sexo = c(1, -1)
              )) %>% data.frame()
```

	contrast	diff_sexo
diff_sexo	-0.0107	0.0213

Contrastes no independiente

```
vcov(razon_sexo)
```

	Female	Male
Female	0.0015	0.0014
Male	0.0014	0.0017

```
sqrt(0.0034 + 0.0024 - 2*0.0022)
```

```
## [1] 0.03742
```

Correlación de variables

```
library(jtools)

svycor( ~ Income + Expenditure, design = diseno)$cors %>% c
```

	Income	Expenditure
Income	1.00	0.69
Expenditure	0.69	1.00

```
svycor( ~ Income + Expenditure, design = sub_Hombre)$cors %
```

	Income	Expenditure
Income	1.0000	0.6862
Expenditure	0.6862	1.0000

```
svycor( ~ Income + Expenditure, design = sub_Mujer)$cors %>
```

	Income	Expenditure