Summer\_day (THI analysis)

Structural Equation Model of psem\_model2

Call:

mean\_heartrate ~ phase\_mean\_THI + day\_season + mean\_activity\_percent

mean\_BT\_smooth ~ phase\_mean\_THI + day\_season + day\_season\_sq + mean\_activity\_percent

mean\_heartrate ~~ mean\_BT\_smooth

mean\_activity\_percent ~ season\_year + phase\_mean\_THI + prev\_phase\_mean\_THI

AIC

6556.561

---

Tests of directed separation:

Independ.Claim Test.Type DF Crit.Value P.Value

mean\_activity\_percent ~ day\_season + ... coef 616 -0.5780 0.5635

mean\_heartrate ~ day\_season\_sq + ... coef 615 1.5496 0.1217

mean\_activity\_percent ~ day\_season\_sq + ... coef 616 -0.3904 0.6964

mean\_heartrate ~ season\_year + ... anova 1 0.3326 0.5641

mean\_BT\_smooth ~ season\_year + ... anova 1 0.3403 0.5597

mean\_heartrate ~ prev\_phase\_mean\_THI + ... coef 615 0.0911 0.9274

mean\_BT\_smooth ~ prev\_phase\_mean\_THI + ... coef 614 0.2846 0.7760

--

Global goodness-of-fit:

Chi-Squared = 3.715 with P-value = 0.812 and on 7 degrees of freedom

Fisher's C = 9.046 with P-value = 0.828 and on 14 degrees of freedom

---

Coefficients:

Response Predictor Estimate Std.Error DF Crit.Value P.Value Std.Estimate

mean\_heartrate phase\_mean\_THI 0.1104 0.0364 616 3.0302 0.0025 0.0621 \*\*

mean\_heartrate day\_season -0.1118 0.0217 616 -5.1617 0.0000 -0.2787 \*\*\*

mean\_heartrate mean\_activity\_percent 0.5366 0.1102 616 4.8719 0.0000 0.1998 \*\*\*

mean\_BT\_smooth phase\_mean\_THI 1e-04 0.0012 615 0.0849 0.9324 0.0027

mean\_BT\_smooth day\_season 0.0036 0.0016 615 2.2305 0.0261 0.4352 \*

mean\_BT\_smooth day\_season\_sq -1e-04 0 615 -3.1161 0.0019 -0.6068 \*\*

mean\_BT\_smooth mean\_activity\_percent 7e-04 0.0018 615 0.3829 0.7019 0.0125

~~mean\_heartrate ~~mean\_BT\_smooth 0.0331 - 635 0.8321 0.2028 0.0331

mean\_activity\_percent phase\_mean\_THI 0.0493 0.0416 617 1.1844 0.2367 0.0745

mean\_activity\_percent prev\_phase\_mean\_THI 0.0487 0.0172 617 2.8233 0.0049 0.0961 \*\*

mean\_activity\_percent season\_year - - 1 17.5945 0.0000 - \*\*\*

mean\_activity\_percent season\_year = Summer\_20 9.1695 0.6334 14 14.4760 0.0000 - \*\*\*

mean\_activity\_percent season\_year = Summer\_19 12.0021 0.5309 15 22.6084 0.0000 - \*\*\*

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05

---

Individual R-squared:

Response method Marginal Conditional

mean\_heartrate none 0.09 0.72

mean\_BT\_smooth none 0.05 0.30

mean\_activity\_percent none 0.13 0.39

The standardized regression coefficients are not calculated for mean percent activity because a categorical variable is included. I calculated them by hand Std.Estimate = estimate\* sd(predictor)/ sd(mean\_activity\_percent)

Winter day ML

Structural Equation Model of psem\_model2

Call:

mean\_heartrate ~ season\_year + phase\_mean\_THI + +day\_season + day\_season\_sq + weight + mean\_activity\_percent

mean\_BT\_smooth ~ phase\_mean\_THI + day\_season + mean\_activity\_percent

mean\_heartrate ~~ mean\_BT\_smooth

mean\_activity\_percent ~ phase\_mean\_THI

AIC

3901.821

---

Tests of directed separation:

Independ.Claim Test.Type DF Crit.Value P.Value

mean\_activity\_percent ~ season\_year + ... anova 1 0.3902 0.5322

mean\_BT\_smooth ~ season\_year + ... anova 1 2.3611 0.1244

mean\_activity\_percent ~ day\_season + ... coef 351 1.1028 0.2709

mean\_activity\_percent ~ day\_season\_sq + ... coef 351 1.4364 0.1518

mean\_BT\_smooth ~ day\_season\_sq + ... coef 349 -0.0194 0.9845

mean\_activity\_percent ~ weight + ... coef 12 -1.3350 0.2066

mean\_BT\_smooth ~ weight + ... coef 12 0.9878 0.3428

--

Global goodness-of-fit:

Chi-Squared = 9.278 with P-value = 0.233 and on 7 degrees of freedom

Fisher's C = 17.139 with P-value = 0.249 and on 14 degrees of freedom

---

Coefficients:

Response Predictor Estimate Std.Error DF Crit.Value P.Value Std.Estimate

mean\_heartrate phase\_mean\_THI 0.0366 0.0294 349 1.2452 0.2139 0.0260

mean\_heartrate day\_season -0.4546 0.0891 349 -5.1019 0.0000 -1.0831 \*\*\*

mean\_heartrate day\_season\_sq 0.0029 9e-04 349 3.2076 0.0015 - \*\*

mean\_heartrate weight -0.0931 0.0199 11 -4.6796 0.0007 -0.4131 \*\*\*

mean\_heartrate mean\_activity\_percent 0.2471 0.0529 349 4.6708 0.0000 0.0944 \*\*\*

mean\_heartrate season\_year - - 1 4.5137 0.0336 0.6668 \*

mean\_heartrate season\_year = Winter\_2019 51.1662 1.4156 11 36.1436 0.0000 - \*\*\*

mean\_heartrate season\_year = Winter\_2018 54.725 1.1665 11 46.9121 0.0000 - \*\*\*

mean\_BT\_smooth phase\_mean\_THI -4e-04 0.0014 350 -0.3141 0.7537 -0.0146

mean\_BT\_smooth day\_season -0.0018 6e-04 350 -2.9362 0.0035 -0.1986 \*\*

mean\_BT\_smooth mean\_activity\_percent -5e-04 0.0025 350 -0.1985 0.8428 -0.0089

~~mean\_heartrate ~~mean\_BT\_smooth 0.1825 - 367 3.5407 0.0002 0.1825 \*\*\*

mean\_activity\_percent phase\_mean\_THI -0.0787 0.0239 352 -3.2926 0.0011 -0.1459 \*\*

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05

---

Individual R-squared:

Response method Marginal Conditional

mean\_heartrate none 0.64 0.65

mean\_BT\_smooth none 0.04 0.26

mean\_activity\_percent none 0.02 0.37

Winter day REML

Structural Equation Model of psem\_model\_REML

Call:

mean\_heartrate ~ season\_year + phase\_mean\_THI + +day\_season + day\_season\_sq + weight + mean\_activity\_percent

mean\_BT\_smooth ~ phase\_mean\_THI + day\_season + mean\_activity\_percent

mean\_heartrate ~~ mean\_BT\_smooth

mean\_activity\_percent ~ phase\_mean\_THI

AIC

3974.153

---

Tests of directed separation:

Independ.Claim Test.Type DF Crit.Value P.Value

mean\_activity\_percent ~ season\_year + ... anova 1 0.3088 0.5784

mean\_BT\_smooth ~ season\_year + ... anova 1 2.0756 0.1497

mean\_activity\_percent ~ day\_season + ... coef 351 1.0864 0.2781

mean\_activity\_percent ~ day\_season\_sq + ... coef 351 1.4238 0.1554

mean\_BT\_smooth ~ day\_season\_sq + ... coef 349 -0.0227 0.9819

mean\_activity\_percent ~ weight + ... coef 12 -1.1536 0.2711

mean\_BT\_smooth ~ weight + ... coef 12 0.9115 0.3800

--

Global goodness-of-fit:

Chi-Squared = NA with P-value = NA and on 7 degrees of freedom

Fisher's C = 15.759 with P-value = 0.328 and on 14 degrees of freedom

---

Coefficients:

Response Predictor Estimate Std.Error DF Crit.Value P.Value Std.Estimate

mean\_heartrate phase\_mean\_THI 0.0361 0.0292 349 1.2334 0.2183 -

mean\_heartrate day\_season -0.4488 0.0897 349 -5.0006 0.0000 - \*\*\*

mean\_heartrate day\_season\_sq 0.0029 9e-04 349 3.1388 0.0018 - \*\*

mean\_heartrate weight -0.0932 0.0235 11 -3.9613 0.0022 - \*\*

mean\_heartrate mean\_activity\_percent 0.2462 0.0528 349 4.6583 0.0000 - \*\*\*

mean\_heartrate season\_year - - 1 3.5755 0.0586 -

mean\_heartrate season\_year = Winter\_2019 51.0928 1.6432 11 31.0940 0.0000 - \*\*\*

mean\_heartrate season\_year = Winter\_2018 54.8224 1.3906 11 39.4248 0.0000 - \*\*\*

mean\_BT\_smooth phase\_mean\_THI -5e-04 0.0014 350 -0.3219 0.7478 -0.0149

mean\_BT\_smooth day\_season -0.0018 6e-04 350 -2.9130 0.0038 -0.1976 \*\*

mean\_BT\_smooth mean\_activity\_percent -5e-04 0.0025 350 -0.2061 0.8369 -0.0093

~~mean\_heartrate ~~mean\_BT\_smooth 0.1909 - 367 3.7105 0.0001 0.1909 \*\*\*

mean\_activity\_percent phase\_mean\_THI -0.0787 0.0239 352 -3.2988 0.0011 -0.1461 \*\*

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05

---

Individual R-squared:

Response method Marginal Conditional

mean\_heartrate none 0.61 0.65

mean\_BT\_smooth none 0.04 0.27

mean\_activity\_percent none 0.02 0.38

Warning messages:

1: Check model convergence: log-likelihood estimates lead to negative Chi-squared!

Spring day

|  |
| --- |
| Structural Equation Model of psem\_model2  Call:  mean\_heartrate ~ phase\_mean\_THI + day\_season + day\_season\_sq + mean\_activity\_percent  mean\_BT\_smooth ~ phase\_mean\_THI + day\_season + mean\_activity\_percent  mean\_heartrate ~~ mean\_BT\_smooth  mean\_activity\_percent ~ phase\_mean\_THI + day\_season  AIC  6426.168  ---  Tests of directed separation:  Independ.Claim Test.Type DF Crit.Value P.Value  mean\_activity\_percent ~ day\_season\_sq + ... coef 622 -0.7547 0.4507  mean\_BT\_smooth ~ day\_season\_sq + ... coef 621 1.2442 0.2139  --  Global goodness-of-fit:  Chi-Squared = 2.104 with P-value = 0.349 and on 2 degrees of freedom  Fisher's C = 4.678 with P-value = 0.322 and on 4 degrees of freedom  ---  Coefficients:  Response Predictor Estimate Std.Error DF Crit.Value P.Value Std.Estimate  mean\_heartrate phase\_mean\_THI 0.0943 0.0254 621 3.7131 0.0002 0.0685 \*\*\*  mean\_heartrate day\_season 0.3573 0.078 621 4.5824 0.0000 0.8668 \*\*\*  mean\_heartrate day\_season\_sq -0.0017 6e-04 621 -2.5988 0.0096 -0.4025 \*\*  mean\_heartrate mean\_activity\_percent 0.3191 0.0418 621 7.6309 0.0000 0.1157 \*\*\*  mean\_BT\_smooth phase\_mean\_THI -0.0006 8e-04 622 -0.6805 0.4964 -0.0188  mean\_BT\_smooth day\_season 0.0031 6e-04 622 5.1354 0.0000 0.3498 \*\*\*  mean\_BT\_smooth mean\_activity\_percent -0.0006 0.0013 622 -0.4868 0.6265 -0.0106  ~~mean\_heartrate ~~mean\_BT\_smooth 0.1264 - 642 3.2213 0.0007 0.1264 \*\*\*  mean\_activity\_percent phase\_mean\_THI -0.0699 0.0231 623 -3.0271 0.0026 -0.1399 \*\*  mean\_activity\_percent day\_season 0.0158 0.0068 623 2.3242 0.0204 0.1057 \*  Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05  ---  Individual R-squared:  Response method Marginal Conditional  mean\_heartrate none 0.30 0.78  mean\_BT\_smooth none 0.13 0.55  mean\_activity\_percent none 0.01 0.18 |

Autumn day

Structural Equation Model of psem\_model2

Call:

mean\_heartrate ~ phase\_mean\_THI + phase\_mean\_THI\_sq + day\_season + day\_season\_sq + mean\_activity\_percent + mean\_activity\_percent\_sq

mean\_BT\_smooth ~ season\_year + phase\_mean\_THI + mean\_activity\_percent

mean\_heartrate ~~ mean\_BT\_smooth

mean\_activity\_percent ~ season\_year + phase\_mean\_THI + day\_season

AIC

3334.428

---

Tests of directed separation:

Independ.Claim Test.Type DF Crit.Value P.Value

mean\_activity\_percent ~ phase\_mean\_THI\_sq + ... coef 322 -1.1864 0.2363

mean\_BT\_smooth ~ phase\_mean\_THI\_sq + ... coef 322 1.3059 0.1925

mean\_BT\_smooth ~ day\_season + ... coef 322 -0.0091 0.9927

mean\_activity\_percent ~ day\_season\_sq + ... coef 322 1.4745 0.1413

mean\_BT\_smooth ~ day\_season\_sq + ... coef 322 -0.2148 0.8301

mean\_activity\_percent ~ mean\_activity\_percent\_sq + ... coef 322 62.6841 0.0000 \*\*\*

mean\_BT\_smooth ~ mean\_activity\_percent\_sq + ... coef 322 0.8926 0.3728

mean\_heartrate ~ season\_year + ... anova 2 0.1166 0.9434

--

Global goodness-of-fit:

Chi-Squared = 867.261 with P-value = 0 and on 9 degrees of freedom

Fisher's C = 849.618 with P-value = 0 and on 16 degrees of freedom

---

Coefficients:

Response Predictor Estimate Std.Error DF Crit.Value P.Value Std.Estimate

mean\_heartrate phase\_mean\_THI -0.5305 0.3102 319 -1.7102 0.0882 -0.5233

mean\_heartrate phase\_mean\_THI\_sq 0.0046 0.0024 319 1.9138 0.0565 0.5608

mean\_heartrate day\_season 0.1766 0.0957 319 1.8451 0.0660 0.4738

mean\_heartrate day\_season\_sq -0.0022 0.001 319 -2.1256 0.0343 -0.4984 \*

mean\_heartrate mean\_activity\_percent 0.9293 0.2392 319 3.8850 0.0001 0.3361 \*\*\*

mean\_heartrate mean\_activity\_percent\_sq -0.0285 0.0109 319 -2.6270 0.0090 -0.2274 \*\*

mean\_BT\_smooth phase\_mean\_THI -0.0012 0.0011 323 -1.1159 0.2653 -0.0736

mean\_BT\_smooth mean\_activity\_percent -0.0014 0.0022 323 -0.6491 0.5168 -0.0315

mean\_BT\_smooth season\_year - - 2 11.3037 0.0035 - \*\*

mean\_BT\_smooth season\_year = Fall\_19 39.0357 0.0266 11 1470.1137 0.0000 - \*\*\*

mean\_BT\_smooth season\_year = Fall\_18 39.1525 0.0415 13 943.8336 0.0000 - \*\*\*

mean\_BT\_smooth season\_year = Fall\_20 39.3585 0.1265 11 311.0592 0.0000 - \*\*\*

~~mean\_heartrate ~~mean\_BT\_smooth 0.078 - 339 1.4340 0.0762 0.078

mean\_activity\_percent phase\_mean\_THI 0.0457 0.0304 323 1.5046 0.1334 0.125

mean\_activity\_percent day\_season -0.0165 0.0108 323 -1.5185 0.1299 -0.122

mean\_activity\_percent season\_year - - 2 4.8841 0.0870 -

mean\_activity\_percent season\_year = Fall\_20 7.0478 1.6933 11 4.1622 0.0016 - \*\*

mean\_activity\_percent season\_year = Fall\_18 9.4944 1.1974 13 7.9294 0.0000 - \*\*\*

mean\_activity\_percent season\_year = Fall\_19 10.8038 0.5575 11 19.3787 0.0000 - \*\*\*

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05

---

Individual R-squared:

Response method Marginal Conditional

mean\_heartrate none 0.07 0.50

mean\_BT\_smooth none 0.15 0.56

mean\_activity\_percent none 0.08 0.22

Summer night

Structural Equation Model of psem\_model2

Call:

mean\_heartrate ~ phase\_mean\_THI + day\_season + weight + mean\_activity\_percent

mean\_BT\_smooth ~ phase\_mean\_THI + day\_season\_sq + mean\_activity\_percent

mean\_heartrate ~~ mean\_BT\_smooth

mean\_activity\_percent ~ season\_year + phase\_mean\_THI

AIC

4814.420

---

Tests of directed separation:

Independ.Claim Test.Type DF Crit.Value P.Value

mean\_activity\_percent ~ day\_season + ... coef 418 0.1159 0.9078

mean\_BT\_smooth ~ day\_season + ... coef 416 1.2371 0.2167

mean\_activity\_percent ~ weight + ... coef 10 -0.0077 0.9940

mean\_BT\_smooth ~ weight + ... coef 11 -0.3544 0.7297

mean\_heartrate ~ day\_season\_sq + ... coef 416 -0.3983 0.6906

mean\_activity\_percent ~ day\_season\_sq + ... coef 418 0.4553 0.6491

mean\_heartrate ~ season\_year + ... anova 1 0.4445 0.5050

mean\_BT\_smooth ~ season\_year + ... anova 1 1.2929 0.2555

--

Global goodness-of-fit:

Chi-Squared = 4.469 with P-value = 0.813 and on 8 degrees of freedom

Fisher's C = 9.594 with P-value = 0.887 and on 16 degrees of freedom

---

Coefficients:

Response Predictor Estimate Std.Error DF Crit.Value P.Value Std.Estimate

mean\_heartrate phase\_mean\_THI 0.0178 0.0462 417 0.3857 0.6999 0.0094

mean\_heartrate day\_season -0.1245 0.0244 417 -5.0935 0.0000 -0.294 \*\*\*

mean\_heartrate weight 0.1378 0.0455 11 3.0289 0.0115 0.5314 \*

mean\_heartrate mean\_activity\_percent 0.4206 0.0843 417 4.9906 0.0000 0.1681 \*\*\*

mean\_BT\_smooth phase\_mean\_THI 0.0046 0.0019 417 2.4757 0.0137 0.0993 \*

mean\_BT\_smooth day\_season\_sq 0 0 417 -2.0693 0.0391 -0.1297 \*

mean\_BT\_smooth mean\_activity\_percent -0.0028 0.0025 417 -1.1239 0.2617 -0.0449

~~mean\_heartrate ~~mean\_BT\_smooth 0.0023 - 433 0.0479 0.4809 0.0023

mean\_activity\_percent phase\_mean\_THI -0.055 0.0607 419 -0.9062 0.3653 -0.0725

mean\_activity\_percent season\_year - - 1 4.7587 0.0291 - \*

mean\_activity\_percent season\_year = Summer\_20 7.362 0.8094 11 9.0960 0.0000 - \*\*\*

mean\_activity\_percent season\_year = Summer\_19 9.5265 0.6055 12 15.7331 0.0000 - \*\*\*

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05

---

Individual R-squared:

Response method Marginal Conditional

mean\_heartrate none 0.45 0.66

mean\_BT\_smooth none 0.03 0.33

mean\_activity\_percent none 0.05 0.23

Spring night ML

Structural Equation Model of psem\_model2

Call:

mean\_heartrate ~ phase\_mean\_THI + day\_season + mean\_activity\_percent

mean\_BT\_smooth ~ day\_season\_sq + phase\_mean\_THI + mean\_activity\_percent + prev\_phase\_mean\_THI

mean\_heartrate ~~ mean\_BT\_smooth

mean\_activity\_percent ~ phase\_mean\_THI

AIC

5748.385

---

Tests of directed separation:

Independ.Claim Test.Type DF Crit.Value P.Value

mean\_activity\_percent ~ day\_season + ... coef 526 -0.0083 0.9934

mean\_BT\_smooth ~ day\_season + ... coef 523 0.6232 0.5334

mean\_heartrate ~ day\_season\_sq + ... coef 524 -1.1759 0.2402

mean\_activity\_percent ~ day\_season\_sq + ... coef 526 -0.2404 0.8101

mean\_heartrate ~ prev\_phase\_mean\_THI + ... coef 524 -0.3553 0.7225

mean\_activity\_percent ~ prev\_phase\_mean\_THI + ... coef 526 0.4660 0.6414

--

Global goodness-of-fit:

Chi-Squared = 2.813 with P-value = 0.832 and on 6 degrees of freedom

Fisher's C = 6.082 with P-value = 0.912 and on 12 degrees of freedom

---

Coefficients:

Response Predictor Estimate Std.Error DF Crit.Value P.Value Std.Estimate

mean\_heartrate phase\_mean\_THI 0.0449 0.033 525 1.3605 0.1743 0.0266

mean\_heartrate day\_season 0.2413 0.0517 525 4.6675 0.0000 0.5799 \*\*\*

mean\_heartrate mean\_activity\_percent 0.3129 0.0388 525 8.0723 0.0000 0.1291 \*\*\*

mean\_BT\_smooth day\_season\_sq 0.0000 0 524 5.6852 0.0000 0.3599 \*\*\*

mean\_BT\_smooth phase\_mean\_THI 0.0018 0.0014 524 1.3075 0.1916 0.0430

mean\_BT\_smooth mean\_activity\_percent -0.0046 0.0016 524 -2.8535 0.0045 -0.0746 \*\*

mean\_BT\_smooth prev\_phase\_mean\_THI -0.0029 0.0011 524 -2.6804 0.0076 -0.0841 \*\*

~~mean\_heartrate ~~mean\_BT\_smooth 0.1428 - 544 3.3568 0.0004 0.1428 \*\*\*

mean\_activity\_percent phase\_mean\_THI -0.0031 0.029 527 -0.1066 0.9152 -0.0044

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05

---

Individual R-squared:

Response method Marginal Conditional

mean\_heartrate none 0.34 0.80

mean\_BT\_smooth none 0.14 0.59

mean\_activity\_percent none 0.00 0.27

Spring night REML

Structural Equation Model of psem\_model\_REML

Call:

mean\_heartrate ~ phase\_mean\_THI + day\_season + mean\_activity\_percent

mean\_BT\_smooth ~ day\_season\_sq + phase\_mean\_THI + mean\_activity\_percent + prev\_phase\_mean\_THI

mean\_heartrate ~~ mean\_BT\_smooth

mean\_activity\_percent ~ phase\_mean\_THI

AIC

5824.597

---

Tests of directed separation:

Independ.Claim Test.Type DF Crit.Value P.Value

mean\_activity\_percent ~ day\_season + ... coef 526 -0.0157 0.9875

mean\_BT\_smooth ~ day\_season + ... coef 523 0.6376 0.5240

mean\_heartrate ~ day\_season\_sq + ... coef 524 -1.1776 0.2395

mean\_activity\_percent ~ day\_season\_sq + ... coef 526 -0.2483 0.8040

mean\_heartrate ~ prev\_phase\_mean\_THI + ... coef 524 -0.3538 0.7236

mean\_activity\_percent ~ prev\_phase\_mean\_THI + ... coef 526 0.4577 0.6474

--

Global goodness-of-fit:

Chi-Squared = NA with P-value = NA and on 6 degrees of freedom

Fisher's C = 6.129 with P-value = 0.909 and on 12 degrees of freedom

---

Coefficients:

Response Predictor Estimate Std.Error DF Crit.Value P.Value Std.Estimate

mean\_heartrate phase\_mean\_THI 0.0448 0.033 525 1.3593 0.1747 0.0265

mean\_heartrate day\_season 0.2407 0.0535 525 4.4977 0.0000 0.5785 \*\*\*

mean\_heartrate mean\_activity\_percent 0.3130 0.0387 525 8.0899 0.0000 0.1291 \*\*\*

mean\_BT\_smooth day\_season\_sq 0.0000 0 524 5.4837 0.0000 0.3605 \*\*\*

mean\_BT\_smooth phase\_mean\_THI 0.0018 0.0014 524 1.2762 0.2025 0.0419

mean\_BT\_smooth mean\_activity\_percent -0.0045 0.0016 524 -2.8457 0.0046 -0.0743 \*\*

mean\_BT\_smooth prev\_phase\_mean\_THI -0.0029 0.0011 524 -2.6933 0.0073 -0.0843 \*\*

~~mean\_heartrate ~~mean\_BT\_smooth 0.1416 - 544 3.3275 0.0005 0.1416 \*\*\*

mean\_activity\_percent phase\_mean\_THI -0.0034 0.029 527 -0.1159 0.9078 -0.0048

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05

---

Individual R-squared:

Response method Marginal Conditional

mean\_heartrate none 0.33 0.81

mean\_BT\_smooth none 0.14 0.61

mean\_activity\_percent none 0.00 0.28

Warning message:

Check model convergence: log-likelihood estimates lead to negative Chi-squared!

Fall night ML

Structural Equation Model of psem\_model2

Call:

mean\_heartrate ~ phase\_mean\_THI + mean\_activity\_percent + mean\_activity\_percent\_sq

mean\_BT\_smooth ~ phase\_mean\_THI + mean\_activity\_percent + prev\_phase\_mean\_THI

mean\_heartrate ~~ mean\_BT\_smooth

mean\_activity\_percent ~ phase\_mean\_THI + day\_season + day\_season\_sq + prev\_phase\_mean\_THI

AIC

3271.054

---

Tests of directed separation:

Independ.Claim Test.Type DF Crit.Value P.Value

mean\_activity\_percent ~ mean\_activity\_percent\_sq + ... coef 309 54.1890 0.0000 \*\*\*

mean\_BT\_smooth ~ mean\_activity\_percent\_sq + ... coef 310 0.6259 0.5319

mean\_heartrate ~ prev\_phase\_mean\_THI + ... coef 310 0.0174 0.9862

mean\_heartrate ~ day\_season + ... coef 310 -0.0859 0.9316

mean\_BT\_smooth ~ day\_season + ... coef 310 -0.5358 0.5925

mean\_heartrate ~ day\_season\_sq + ... coef 310 -0.1448 0.8850

mean\_BT\_smooth ~ day\_season\_sq + ... coef 310 0.0609 0.9515

--

Global goodness-of-fit:

Chi-Squared = 745.828 with P-value = 0 and on 7 degrees of freedom

Fisher's C = 735.575 with P-value = 0 and on 14 degrees of freedom

---

Coefficients:

Response Predictor Estimate Std.Error DF Crit.Value P.Value Std.Estimate

mean\_heartrate phase\_mean\_THI 0.0899 0.0358 311 2.5113 0.0125 0.0745 \*

mean\_heartrate mean\_activity\_percent 0.7880 0.1853 311 4.2519 0.0000 0.2908 \*\*\*

mean\_heartrate mean\_activity\_percent\_sq -0.0293 0.0092 311 -3.1875 0.0016 -0.2137 \*\*

mean\_BT\_smooth phase\_mean\_THI 0.0048 0.0012 311 3.8362 0.0002 0.2317 \*\*\*

mean\_BT\_smooth mean\_activity\_percent 0.0003 0.0021 311 0.1470 0.8832 0.0066

mean\_BT\_smooth prev\_phase\_mean\_THI -0.0024 0.0011 311 -2.1091 0.0357 -0.1354 \*

~~mean\_heartrate ~~mean\_BT\_smooth 0.0930 - 328 1.6843 0.0465 0.0930 \*

mean\_activity\_percent phase\_mean\_THI -0.1341 0.0344 310 -3.9027 0.0001 -0.3012 \*\*\*

mean\_activity\_percent day\_season 0.0859 0.0286 310 3.0048 0.0029 0.6216 \*\*

mean\_activity\_percent day\_season\_sq -0.0010 3e-04 310 -3.0908 0.0022 -0.6548 \*\*

mean\_activity\_percent prev\_phase\_mean\_THI 0.0795 0.0261 310 3.0461 0.0025 0.2067 \*\*

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05

---

Individual R-squared:

Response method Marginal Conditional

mean\_heartrate none 0.03 0.55

mean\_BT\_smooth none 0.03 0.51

mean\_activity\_percent none 0.08 0.21

Winter night

Structural Equation Model of psem\_model2

Call:

mean\_heartrate ~ season\_year + phase\_mean\_THI + +day\_season + day\_season\_sq + weight + mean\_activity\_percent + mean\_activity\_percent\_sq

mean\_BT\_smooth ~ phase\_mean\_THI + day\_season + mean\_activity\_percent

mean\_heartrate ~~ mean\_BT\_smooth

mean\_activity\_percent ~ phase\_mean\_THI

AIC

4586.685

---

Tests of directed separation:

Independ.Claim Test.Type DF Crit.Value P.Value

mean\_activity\_percent ~ season\_year + ... anova 1 0.3874 0.5337

mean\_BT\_smooth ~ season\_year + ... anova 1 0.6127 0.4338

mean\_activity\_percent ~ day\_season + ... coef 429 -0.9229 0.3566

mean\_activity\_percent ~ day\_season\_sq + ... coef 429 -0.8471 0.3974

mean\_BT\_smooth ~ day\_season\_sq + ... coef 427 0.1300 0.8966

mean\_activity\_percent ~ weight + ... coef 13 -1.5824 0.1376

mean\_BT\_smooth ~ weight + ... coef 13 0.6872 0.5040

mean\_activity\_percent ~ mean\_activity\_percent\_sq + ... coef 429 67.7209 0.0000 \*\*\*

mean\_BT\_smooth ~ mean\_activity\_percent\_sq + ... coef 427 0.1766 0.8599

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Global goodness-of-fit:

Chi-Squared = 1096.689 with P-value = 0 and on 9 degrees of freedom

Fisher's C = 1073.923 with P-value = 0 and on 18 degrees of freedom

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Coefficients:

Response Predictor Estimate Std.Error DF Crit.Value P.Value Std.Estimate

mean\_heartrate phase\_mean\_THI 0.047 0.0356 426 1.3200 0.1875 0.0251

mean\_heartrate day\_season -0.3116 0.0761 426 -4.0943 0.0001 -0.7272 \*\*\*

mean\_heartrate day\_season\_sq 0.0016 8e-04 426 1.9688 0.0496 0.3532 \*

mean\_heartrate weight -0.0968 0.0238 12 -4.0745 0.0015 -0.4098 \*\*

mean\_heartrate mean\_activity\_percent 0.5232 0.1223 426 4.2768 0.0000 0.2228 \*\*\*

mean\_heartrate mean\_activity\_percent\_sq -0.0105 0.0056 426 -1.8816 0.0606 -0.0933

mean\_heartrate season\_year - - 1 5.7472 0.0165 - \*

mean\_heartrate season\_year = Winter\_2019 51.5366 1.48 12 34.8223 0.0000 - \*\*\*

mean\_heartrate season\_year = Winter\_2018 56.0291 1.3602 12 41.1905 0.0000 - \*\*\*

mean\_BT\_smooth phase\_mean\_THI 0.0048 0.0017 428 2.7701 0.0058 0.1166 \*\*

mean\_BT\_smooth day\_season -0.0019 6e-04 428 -3.3289 0.0009 -0.2022 \*\*\*

mean\_BT\_smooth mean\_activity\_percent -0.0031 0.0019 428 -1.6729 0.0951 -0.0602

~~mean\_heartrate ~~mean\_BT\_smooth 0.1418 - 446 3.0153 0.0014 0.1418 \*\*

mean\_activity\_percent phase\_mean\_THI -0.0757 0.0353 430 -2.1449 0.0325 -0.095 \*

Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05

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Individual R-squared:

Response method Marginal Conditional

mean\_heartrate none 0.64 0.71

mean\_BT\_smooth none 0.07 0.34

mean\_activity\_percent none 0.01 0.47