Supplementary materials

The interpretation of verbal moods in Spanish: A close replication of Kanwit and Geeslin (2014)

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**Courses used for data collection**

In France, the Level 1 participants were in their first year of an applied languages program, in which students were studying Spanish and English. The data were collected in translation courses. The Level 2 participants were enrolled in second-year translation courses in the applied languages program or in a written and oral expression class for language majors focusing only on Spanish. In Sweden, the Level 1 participants were either in a preparatory language class that was designed for students who had not studied Spanish before entering the university or in a first-semester basic language course geared toward students who had studied Spanish either for a minimum of three years in high school or minimum of three years in school prior to high school plus a minimum of one year in high school. Level 2 participants were in a second-semester intermediate course or third-, fourth, or fifth-semester advanced courses. The intermediate and advanced-level courses were literature, culture and linguistics courses.

**Additional languages of the participants**

The additional languages of the L1 French participants were Arabic (*n* = 4), Chinese (*n* = 4), English (*n* = 60), German (*n* = 1), Italian (*n* = 8), Japanese (*n* = 2), Korean (*n* = 2), Portuguese (*n* = 6), Russian (*n* = 4), and Turkish (*n* = 1). The additional languages of the L1 Swedish participants were Arabic (*n* = 2), Bosnian/Croatian/Serbian (*n* = 1), Danish (*n* = 4), Dutch (*n* = 2), English (*n* = 52), Esperanto (*n* = 1), French (*n* = 14), German (*n* = 8), Italian (*n* = 2), Japanese (*n* = 1), Korean (*n* = 3), Latin (*n* = 4), Mandarin (*n* = 2), Norwegian (*n* = 3), Russian (*n* = 1), and Slovak (*n* = 1). Participants could list up to four additional languages on the background questionnaire.

**Interpretation task**

The interpretation task is below (shared with permission, M. Kanwit, personal communication, August 25, 2023). Changes between the original instrument used in Kanwit and Geeslin (2014) and the instrument we used (items 9, 10, 14, 15, 18, 19, 20, 23) are indicated as follows: Strikethrough text was removed from the original task and text in bold was added to the current instrument. Translations of the Spanish sentences are below the instrument.

For each item, read the sentence and select the letter that corresponds to your interpretation. If you feel that both of the first two interpretations are possible, you may select “c.”

1. Hablamos del fútbol americano cuando está Marcos.
2. Marcos is frequently present.
3. Marcos is not yet present.
4. Both interpretations are possible.
5. Después de que yo tome la siesta, mi madre me prepara una merienda.
6. I frequently take naps.
7. I have not yet taken a nap.
8. Both interpretations are possible.
9. Hasta que corremos, no nos das comida.
10. We regularly run.
11. We haven’t yet run.
12. Both interpretations are possible.
13. Después de que los chicos juegan al fútbol, Elena les habla del plan.
14. The boys have not yet played soccer.
15. The boys regularly play soccer.
16. Both interpretations are possible.
17. Salimos del campus cuando venga María.
18. María regularly arrives.
19. María has not yet arrived.
20. Both interpretations are possible.
21. Tu vecino te mira hasta que le ofreces una bebida.
22. You haven’t yet offered him a drink.
23. You usually offer him a drink.
24. Both interpretations are possible.
25. Después de que sus amigos hacen la tarea, Natalia los llama por teléfono.
26. Her friends regularly do their homework.
27. Her friends have not yet done their homework.
28. Both interpretations are possible.
29. El jugador baila hasta que los aficionados lo miren.
30. The fans have not yet looked at him.
31. The fans regularly look at him.
32. Both interpretations are possible.
33. Vamos a ~~Upland Brewery~~ **un bar** cuando nos ofrecen una cena gratuita.
34. They occasionally offer us a free dinner.
35. They have not yet offered us a free dinner.
36. Both interpretations are possible.
37. Marcos va al museo después de que **su primo** salga ~~su primo~~ **de su casa**.
38. His cousin hasn’t yet left.
39. His cousin usually leaves.
40. Both interpretations are possible.
41. Hasta que coma tu perro, esperas en la cocina.
42. Your dog has not yet eaten.
43. Your dog usually eats.
44. Both interpretations are possible.
45. Cuando Marta tiene tiempo libre, Julio la visita.
46. Marta regularly has free time.
47. Marta has not yet had free time.
48. Both interpretations are possible.
49. Visitamos el parque después de que traes la comida.
50. You have not yet brought the food.
51. You frequently bring the food.
52. Both interpretations are possible.
53. Tu padre te cuenta cosas hasta que ~~te~~ vayas al centro comercial.
54. You frequently go to the mall.
55. You haven’t yet gone to the mall.
56. Both interpretations are possible.
57. Cuando su novia se vaya, **José** estudia ~~José~~.
58. His girlfriend frequently leaves.
59. His girlfriend has not yet left.
60. Both interpretations are possible.
61. La profesora califica los exámenes después de que los estudiantes los toman.
62. The students have not yet taken the exams.
63. The students frequently take exams.
64. Both interpretations are possible.
65. Hasta que la chica nos diga su opinión sobre la fiesta, no caminamos para su casa.
66. The girl usually tells us her opinion.
67. The girl has not yet told us her opinion.
68. Both interpretations are possible.
69. Cuando **los estudiantes** salen ~~los estudiantes~~ **de la clase**, los profesores hablan del fin de semana.
70. The students regularly leave class.
71. The students have not yet left class.
72. Both interpretations are possible.
73. El camarero ~~anda~~ **se dirige** a la mesa después de que entre el cliente.
74. The customer frequently enters.
75. The customer has not yet entered.
76. Both interpretations are possible.
77. Hasta que **la profesora** aparece ~~la profesora~~ **en clase**, no piensas en el proyecto.
78. The professor hasn’t yet appeared.
79. The professor usually appears.
80. Both interpretations are possible.
81. Cuando visitemos a nuestros abuelos, nos regalan una computadora nueva.
82. We regularly visit our grandparents.
83. We have not yet visited our grandparents.
84. Both interpretations are possible.
85. El jefe explica las reglas hasta que los empleados las entienden.
86. The employees have not yet understood them.
87. The employees frequently understand them.
88. Both interpretations are possible.
89. Después de que vean los programas de televisión, las chicas ~~andan~~ **se dirigen** al centro.
90. The girls frequently watch the tv shows.
91. The girls have not yet watched the tv shows.
92. Both interpretations are possible.
93. Bailamos cuando llegue Juana.

a. Juana frequently arrives.

b. Juana has not yet arrived.

c. Both interpretations are possible.

*Translation*

1. We talk about football when Marcos is here.

2. After I take a nap, my mother prepares me a snack.

3. Until we go for a run, you don’t give us food.

4. After the boys play soccer, Elena talks to them about the plan.

5. We leave campus when María comes.

6. Your neighbor looks at you until you offer him a drink.

7. After her friends do homework, Natalia calls them on the phone.

8. The player dances until the fans look at him.

9. We go to the bar when they offer us free dinner.

10. Marcos goes to the museum after his cousin leaves home.

11. Until your dog eats, you wait in the kitchen.

12. When Marta has free time, Julio visits her.

13. We visit the park after you bring food.

14. Your father tells you things until you go to the mall.

15. When his girlfriend leaves, José studies.

16. The professor grades exams after the students take it.

17. Until the girl tells her opinion about the party, we don’t walk to her house.

18. When the students leave class, the professors talk about the weekend.

19. The waiter walks toward the table after the customer enters.

20. Until the professor appears in class, you do not think about the project.

21. When we visit our grandparents, they gift us a new computer.

22. The boss explains the rules until the employees understand them.

23. After they watch TV programs, the girls go downtown.

24. We dance when Juana arrives.

**Data coding**

The coding of the four independent linguistic variables for one of the task items below is subjunctive (verbal mood), irregular (verbal morphology regularity), preposed (clause order), and *cuando* (adverbial conjunction).

Salimos del campus cuando venga María.

a. María regularly arrives.

b. María has not yet arrived.

c. Both interpretations are possible.

Translation of Spanish sentence: We leave campus when María arrives.

**Statistical details for the regression models that examine all task items**

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| *Results for the fixed effects in the regression models for all items*  |
| Effect | Estimate | SE | *p*-value | CI |
| Level 1 |
| (Intercept) | -0.24 | 0.15 | 0.098 | [-0.53, 0.04] |
| Mood [Indicative] |
|  Subjunctive | -0.30 | 0.11 | 0.006 | [-0.51, -0.09] |
| Adverb [*Cuando*] |
|  *Después de que* | -0.25 | 0.13 | 0.0496 | [-0.51, -0.00] |
|  *Hasta que* | -0.668 | 0.132 | <0.0001 | [-0.93, -0.41] |
| Verbal morphology regularity [irregular] |
|  Regular | 0.27 | 0.11 | 0.015 | [0.05, 0.49] |
| Clause order [Post] |
|  Pre | -0.54 | 0.11 | <0.0001 | [-0.75, -0.33] |
| Level 2 |
| (Intercept) | 0.24 | 0.25 | 0.34 | [-0.25, 0.72] |
| L1[French] |
|  Swedish | 0.74 | 0.31 | 0.02 | [0.13, 1.35] |
| Mood [Indicative] |
|  Subjunctive | -0.10 | 0.19 | 0.62 | [-0.47, 0.28] |
| Adverb [*Cuando*] |
|  *Después de que* | -0.15 | 0.18 | 0.39 | [-0.50, 0.20] |
|  *Hasta que* | -1.07 | 0.19 | <0.0001 | [-1.44, -069] |
| Clause order [Post] |
|  Pre | -0.73 | 0.15 | <0.0001 | [-1.03, -0.44] |
| L1\*Mood [French\*Indicative] |
|  Swedish\*Subjunctive  | -2.47 | 0.33 | <0.0001 | [-3.12, -1.81] |
| *Note.* The model fit the log-odds of the habitual response. Reference points for the independent variables are in brackets. Level 1: McFadden R2 = 0.06; Bayesian Information Criterion [BIC] = 2246.1, versus 2339.76 for the null model. Level 2: McFadden R2 = 0.15; BIC = 1148.4 versus 1295.82 for the null model. |

**Random effect intercepts**

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| *Random effect intercepts for Level 1 regression models* |
| Participant | Effect estimate |
| All items | Indicative items | Subjunctive items |
| FC01 | 0.77 | 0.77 | -0.53 |
| FC02 | 0.50 | 0.77 | -0.99 |
| FC03 | 0.08 | 0.01 | 0.11 |
| FC04 | 0.50 | 0.77 | 0.53 |
| FC06 | 0.77 | 1.02 | 0.31 |
| FC07 | -0.38 | -0.27 | -0.10 |
| FC08 | -0.07 | -0.27 | -0.32 |
| FC09 | -0.55 | -0.57 | -0.32 |
| FC10 | 0.43 | 0.67 | 0.31 |
| FC11 | -0.07 | 0.27 | -0.32 |
| FC12 | 0.50 | 0.27 | -0.53 |
| FC13 | -0.07 | 0.01 | 0.11 |
| FC15 | 0.77 | 1.02 | 0.11 |
| FC16 | 0.63 | 0.27 | -0.53 |
| FC17 | -1.39 | -1.26 | 1.19 |
| FC18 | 0.22 | 0.52 | -0.10 |
| FC20 | 0.22 | 0.27 | -0.99 |
| FC22 | 0.50 | 0.52 | -0.10 |
| FC23 | 0.22 | 0.01 | 0.31 |
| FC24 | -0.74 | -0.27 | 0.31 |
| FC25 | 0.63 | 0.77 | 0.31 |
| FC26 | -0.55 | -0.57 | 0.31 |
| FC27 | -0.38 | -0.27 | 0.11 |
| FC28 | 0.08 | 0.01 | -0.10 |
| FC29 | 0.22 | 0.52 | 0.53 |
| FC30 | 0.63 | 0.77 | -0.10 |
| FC31 | -0.22 | -0.27 | 0.53 |
| FC32 | -0.74 | -0.89 | 0.74 |
| FC33 | 0.22 | -0.27 | -0.76 |
| FC36 | -1.15 | -1.26 | -0.53 |
| FC38 | 0.77 | 0.52 | -0.32 |
| FC39 | 0.36 | 0.27 | -0.32 |
| FC40 | 0.90 | 0.77 | -0.53 |
| FC41 | 0.63 | 0.27 | -0.32 |
| FC42 | 1.17 | 1.27 | -0.32 |
| FC43 | 0.36 | 0.52 | -0.76 |
| FC44 | 1.30 | 1.53 | -0.32 |
| FC45 | -0.55 | -0.89 | 0.74 |
| FC46 | 0.90 | 0.77 | -0.32 |
| FC47 | -0.38 | -0.89 | -0.10 |
| SG12 | 0.22 | -0.57 | -0.76 |
| SG19 | -0.72 | -0.57 | 0.48 |
| SG20 | -0.38 | -0.57 | 0.31 |
| SG21 | 0.36 | 0.77 | 0.74 |
| SG22 | -1.15 | -0.89 | 0.96 |
| SG24 | -0.93 | -0.89 | -0.32 |
| SG27 | -0.07 | -0.57 | -0.32 |
| SG28 | -0.93 | -0.57 | 0.11 |
| SG29 | 0.22 | 0.01 | -0.53 |
| SG30 | 0.22 | 0.27 | -0.32 |
| SG31 | -0.93 | -1.26 | -0.10 |
| SL10 | 0.63 | 1.81 | 1.19 |
| SL11 | -0.07 | 0.01 | 0.31 |
| SL13 | -0.38 | 0.01 | -0.53 |
| SL14 | 0.22 | -1.26 | -0.53 |
| SL15 | 0.36 | 0.52 | -0.10 |
| SL16 | -0.38 | -0.27 | 0.74 |
| SL17 | 0.50 | 0.27 | -0.31 |
| SL18 | -1.15 | -0.89 | 0.96 |
| SL20 | 0.50 | 0.77 | -0.32 |
| SL21 | -0.93 | -0.57 | 0.74 |
| SL22 | 0.08 | 0.01 | 0.11 |
| SL23 | 1.17 | 1.27 | -0.53 |
| SL25 | 0.08 | -0.27 | -0.10 |
| SL26 | 0.08 | 0.01 | 0.31 |
| SL50 | -0.93 | -0.89 | -0.10 |
| SL51 | -0.55 | -0.89 | -0.10 |
| SL52 | 0.22 | 0.27 | -0.10 |
| SL53 | 0.50 | 0.52 | -0.10 |
| SL54 | -1.15 | -0.89 | -0.10 |
| SL55 | -0.22 | -0.89 | -0.32 |
| SL56 | -0.38 | 0.01 | 0.74 |
| SL57 | -0.38 | 0.27 | 1.43 |
| SL58 | 0.36 | 0.27 | -0.10 |
| SL61 | 0.36 | 0.01 | -0.53 |
| SL63 | -0.07 | 0.77 | 0.31 |
| SL64 | -0.02 | -0.30 | 0.26 |

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| *Random effect intercepts for Level 2 regression models* |
| Participant | Effect estimate |
| All items | Indicative items | Subjunctive items |
| FC50 | 0.02 | -0.16 | 0.38 |
| FC52 | 0.30 | -0.47 | -0.02 |
| FC53 | -0.13 | -0.47 | 0.18 |
| FC61 | -0.60 | -0.80 | 0.18 |
| FC62 | 0.02 | -0.80 | -0.02 |
| FC63 | -0.74 | -0.80 | -0.35 |
| FC65 | 0.54 | 0.38 | -0.02 |
| FC67 | 0.72 | -0.16 | -0.65 |
| FC70 | 0.44 | 0.13 | 0.18 |
| FC71 | -0.13 | -0.16 | -0.02 |
| FC72 | 0.80 | 0.97 | -0.22 |
| FC73 | 0.72 | 0.13 | -0.43 |
| FC74 | -0.43 | -0.16 | 0.79 |
| FC76 | -0.77 | -1.15 | 0.38 |
| FC77 | 0.30 | 0.13 | -0.02 |
| FC86 | 0.16 | -0.16 | 0.18 |
| FC87 | 0.30 | -0.47 | -0.22 |
| FC88 | 0.02 | -0.16 | -0.43 |
| FC89 | -0.60 | -1.15 | -0.87 |
| FC90 | 0.02 | 0.13 | 0.79 |
| FC91 | -0.13 | -0.47 | -0.02 |
| FC92 | -0.60 | -0.47 | 0.8 |
| SG01 | 0.23 | -0.16 | -0.46 |
| SG04 | -0.13 | -0.47 | -0.10 |
| SG05 | -0.52 | -1.15 | -0.87 |
| SG06 | -0.11 | -0.16 | -0.59 |
| SG07 | 0.41 | 1.04 | -0.67 |
| SG08 | 0.23 | 1.04 | 0.88 |
| SG09 | -1.37 | -1.57 | -0.26 |
| SG10 | -0.71 | -1.15 | 0.17 |
| SG15 | 0.23 | -0.16 | -0.46 |
| SG16 | -1.37 | -1.57 | -0.05 |
| SG25 | 0.58 | 1.79 | 0.07 |
| SG26 | -1.34 | -1.65 | 0.39 |
| SL03 | 0.47 | 1.35 | 0.19 |
| SL04 | -0.52 | -0.47 | -0.46 |
| SL05 | 0.76 | 2.27 | 0.63 |
| SL06 | 0.76 | 1.79 | -0.26 |
| SL07 | 0.58 | 1.79 | 0.88 |
| SL32 | 0.76 | 2.27 | 0.88 |
| SL33 | -0.14 | -0.16 | -0.05 |
| SL34 | 1.45 | 1.79 | -0.26 |