Do speakers of nominative vs. ergative languages think about Agency in different ways?

Introduction Event roles such as Agent and Patient have been argued to be cross-linguistically universal and crucial for language evolution [1-3]. One challenge to this universal view is that Agent-marking syntactic structures in different languages express different semantic categories [4]. For example, intransitive (one-participant) verbs (e.g., *jump*, *arrive, die*) range on a semantic continuum from more activity-oriented (e.g., *jump*) to more state-oriented (e.g., *die*). In English, the arguments of activity-oriented verbs and state-oriented verbs are expressed in the same way (all are marked by nominative case). In Basque, by contrast, more activity-oriented verbs mark their arguments with what is known as ergative case, while the arguments of more state-oriented verbs are nominative-marked. Hindi is an ergative/absolute language like Basque, but in Hindi arguments of intransitive verbs do not receive ergative case. We investigate whether these different syntactic systems correspond to English, Basque, and Hindi speakers conceptualizing Agency in different ways. Specifically, we test two ways in which Agent roles might differ. First, English, Basque, and Hindi speakers might represent Agent in terms of different prototypes. In linguistic theory, event roles are often analyzed in terms of proto-Properties: for example, being intentional and playing a causative role are properties of proto-Agents whereas being affected is a property of proto-Patients [5]. The proto-Properties that constitute Agency may differ for English, Basque, and Hindi speakers. Second, these speakers might diverge in how they conceptualize the single participant in an intransitive event (e.g., one who jumps, one who arrives) with respect to the Agent category. Consistent with how arguments of intransitive verbs are marked in these languages, English speakers might represent an individual who *arrives* as more Agentive than Basque or Hindi speakers do. We tested these hypotheses using an event categorization task in which participants learned to sort pictures of transitive (two-participant) events into Agent and Patient piles, building on Rissman and Lupyan [6]. At test, we asked participants to generalize these categories to transitive events with more or less prototypical Agents and Patients, testing our first question, and to generalize these categories to intransitive events, testing our second question.

Method   We recruited 108 English, 109 Basque, and 72 Hindi speakers who completed the study online. In the training phase of the experiment, participants saw 28 images of one figure acting on another. Either the Agent or the Patient was shaded red (see Figure 1). Participants learned to group the pictures into "Agent" and "Patient" categories (labelled Category "A" or "B"), receiving accuracy feedback on every trial. Participants then completed a test phase where they viewed new images and decided whether the scenes belonged to Category "A" or "B". This test phase included both transitive and intransitive scenes. The *transitive scenes* featured more or less prototypical Agents and Patients (e.g., the roles in Figure 1 being more prototypical; the roles in a scene of one person whispering to another being less prototypical). We used the prototypicality norms in Rissman and Lupyan [6], who normed the transitive scenes for six of Dowty's proto-Properties: intentionality, causation, movement, change of state, affectedness, and being stationary. The *intransitive scenes* featured both activity-oriented events (e.g., jumping, running) and state-oriented events (e.g., someone grabbing their stomach as if sick); see examples in Figure 2. Across all participants, we test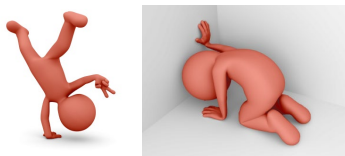ed 48 transitive scenes and 48 intransitive scenes. Each participant viewed 48 transitive trials (half with a red Agent and half with a red Patient) randomly interspersed with 24 intransitive trials (showing a single, red-shaded individual). No feedback was provided on the test trials.

Figure 1. A sample training picture

Figure 2. Sample intransitive scenes

Results & Discussion   Test accuracy for transitive scenes was high: English, Basque, and Hindi speakers correctly categorized the pictures into Agent and Patient categories on 90% of trials (CI_{95} = [88%, 92%]). The same proto-Properties predicted generalization accuracy in the three languages. Participants were more accurate when the Agent was more intentional (English: b = .49, CI_{95} = [.22, .73]; Basque: b = .52, CI_{95} = [.24, .81]; Hindi: b = .55, CI_{95} = [.14, .96]) and when the Agent caused the event (English: b = .26, CI_{95} = [.004, .52]; Basque: b = .46, CI_{95} = [.18, .74]; Hindi: b = .50, CI_{95} = [.1, .9]). These results suggest that English, Basque, and Hindi speakers represent transitive event roles in highly similar ways.

Does this similarity extend to intransitive scenes, for which the three languages use diverging grammatical systems? Rates of classifying the intransitive pictures into the Agent category are

shown in Figure 3. Basque and English speakers tended overall to sort intransitive pictures as Agents, and rates of classifying individual scenes in the Agent category were strongly aligned across these two languages: $r(46)$ = .83, p < .001. For Hindi speakers, by contrast, Intransitive scenes were equally likely to be categorized as Agents or Patients. In addition, Agent sorting rates for individual scenes were not significantly correlated between Hindi and English ($r(46)$ = .27, p > .1) or between Hindi and Basque ($r(46)$ = .15, p > .1). These results suggest that the syntactic difference between Hindi, English, and Basque (where intransitive arguments in Hindi do not receive ergative case) may have influenced participants' conceptualization of these roles.
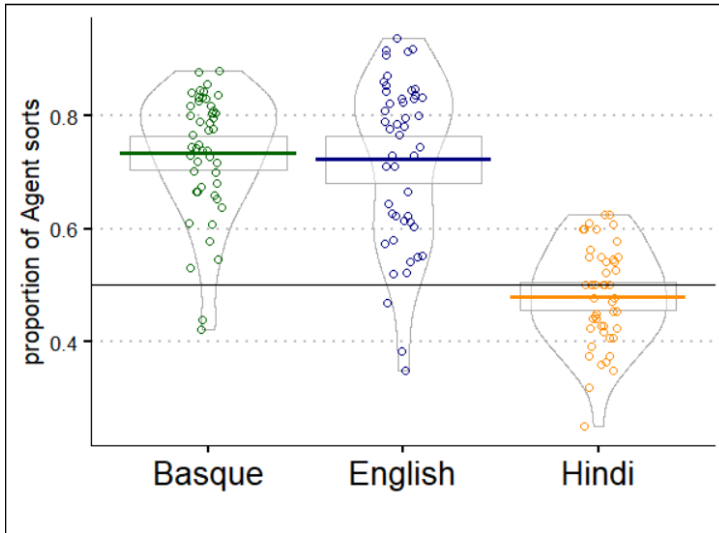
Figure 3. Rates of classifying individual intransitive scenes into the Agent category for Basque vs. English vs. Hindi speakers. Horizontal lines show mean proportion of Agent sorts.

In summary, English, Basque, and Hindi speakers represent transitive Agents in terms of the same prototype, despite the syntactic differences between these languages. Nonetheless, participants sorted the intransitive pictures in divergent ways. This suggests a partial role for syntax in the task: participants were sensitive to the semantics of the intransitive events (a jumping person was more likely to be categorized as an Agent than a sick person) but participants may also have been influenced by the syntactic groupings in their language. This raises the question of whether Hindi speakers conceptualize Agency in different ways than Basque and English speakers do.

References
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