

Roles and the lexical semantics of role-denoting relational adjectives

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Introduction Property adjectives such as *green*, *round*, or *old* define a property of their argument; when combined with a noun, the property is attributed to the referent of the noun. Adjectives of this sort can be thought to define classes in their own right, such as *the green ones* or *the round ones*. Relational or classificatory adjectives, such as *nuclear*, *dental*, or *musical*, in contrast, do not form classes in their own right, but are used to define subclasses of the class denoted by a noun alone: *dental surgery* specifies a subclass of surgeries, while *dental assistant* specifies a subclass of assistants according to who they assist or in what area of medicine they assist in. We examine the lexical semantics of one class of relational adjectives, what we call role-denoting relational adjectives (RAs). In examining these adjectives, we advance a model of the semantics where lexical information is available for compositional operations, and argue against recent theories that claim RAs denote properties of kinds.

Examples of role-denoting RAs include but are not limited to *presidential*, *papal*, *senatorial*, *mayoral*, and *royal*. The examples we consider are often derived from nominals. When used attributively, these adjectives have a meaning that is similar but not identical to that of a possessor in a Saxon genitive. To illustrate, (1a) and (2a) have the implication that the referent of the nominal has a relation to the president with respect to their official duties and responsibilities while in office. Although the referents in (1b) and (2b) may be used by the president during their time in office, they do not have an implication that they have any necessary connection to the office itself; the president's desk may be a favorite desk brought to use in a private study, and the president's advisor may refer to an advisor in non-official matters, such as personal finances. In contrast, the presidential desk is the desk used by the president for their official duties while in office, and a presidential advisor is an advisor to the president in the president's official capacity.

- (1) a. the presidential desk
b. the president's desk (i.e., his personal desk)
- (2) a. a presidential advisor
b. the president's advisor (i.e., a personal finance advisor)

This observation holds for event nominals like *visit* as well. The use of the RA implicates that the visit is an official duty of the president. This relation does not obtain when the agent (the president) is represented as a possessor (compare (3a) and (3b)), or with a verbal predication (see (4)).

- (3) a. the president's visit (to his mother)
b. a presidential visit (#to the president's mother)
- (4) The president visited his mother ↗ There was a presidential visit to the president's mother.

Criticism of Previous Theories Recent semantic accounts of relational adjectives have claimed that Carlsonian kinds play a role in their predication. McNally & Boleda (2004) propose that RAs are properties of kinds. They assume that a common noun such as *arquitecte* 'architect' (Catalan) has a kind argument (x_k) in addition to an argument for an ordinary individual (y_o). A Carlsonian R relation asserts that the ordinary individual is an instantiation of the kind. Relational adjectives such as *tècnic* 'technical' are interpreted intersectively and predicated of the kind.

- (5) a. $\llbracket \textit{arquitecte} \rrbracket = \lambda x_k \lambda y_o [R(y_o, x_k) \wedge \textit{architect}(x_k)]$
b. $\llbracket \textit{tècnic} \rrbracket = \lambda x_k [\textit{technical}(x_k)]$

$$(6) \quad \llbracket \textit{arquitecte tècnic} \rrbracket = \lambda x_k \lambda y_o [R(y_o, x_k) \wedge \mathbf{architect}(x_k) \wedge \mathbf{technical}(x_k)]$$

Arsenijevic et al. (2014) extend this account to ethnic adjectives (EAs) such as *French*. These adjectives are also assumed to be predicates of kinds, but encode an additional **Origin** relation that asserts that the kind arises in the nation denoted by the adjective.

$$(7) \quad \llbracket \textit{French wine} \rrbracket = \lambda y_o \exists x_k [\mathbf{wine}(x_k) \wedge \mathbf{Origin}(x_k, \mathbf{France}) \wedge R(y, x_k)]$$

McNally & Boleda and Arsenijevic et al. predict that RAs should be able to be used predicatively when their argument is a kind. But some RAs (such as *medical*) cannot be used predicatively even with kind-referring expressions (such as *doctors/a doctor*) (as in (8b)). Moreover, some RAs (such as *public*) can be used predicatively even when their argument is not a kind (as in (9)). These inconsistencies weaken the case for RAs simply being properties of kinds.

- (8) a. Why would someone choose not to become a medical doctor? (Google)
 b. *Doctors/*A doctor can be medical.
- (9) **This university is public**, but there are also some private universities and colleges on the island.

If relational adjectives are properties of kinds, we might also expect paraphrases using the noun *kind* to be generally available. However, with the *presidential+N* combinations in the table below, paraphrases with *kind* (e.g., *a presidential kind of desk*) are inapplicable even when paraphrases constructed in other ways are possible. This against suggests that *presidential* is not predicating of kinds.

		=“presidential kind of N”
presidential election	election of the president (THEME)	(inapplicable paraphrase)
presidential office	office [room] used by the president	(inapplicable paraphrase)
presidential desk	desk used by the president	(inapplicable paraphrase)
presidential visit (1)	visit by the president	(inapplicable paraphrase)
presidential visit (2)	visit to the president	(inapplicable paraphrase)
presidential motorcade	motorcade escorting the president	(inapplicable paraphrase)

Table 1: Paraphrases for *presidential+N* combinations

As demonstrated in (10) and also via the available paraphrases for *presidential+N* in the previous table, RAs can show different relations between the adjective and the modified noun. This calls into question the strategy of specifying a relation internally to the adjective, such as with EAs and **Origin**. And although an **Origin** relation is intuitive for the EA subclass, what relation to use for other classes of RA is not clear, making the strategy difficult to generalize.

- (10) a. gynecological clinic (clinic for gynecological problems)
 b. gynecological education (education about gynecology)
 c. gynecological conference (conference for gynecologists)

Last, we worry about the proliferation of kinds, especially about considering too many utterances to be kind-related and trivializing the notion of what counts as a kind.

What’s in a role? Crucial for understanding these types of adjectives exemplified by *presidential* is the concept of a role, and in particular social roles. We consider social roles to belong to a level of social reality distinct from physical reality (cf. Searle’s (1995) institutional facts and brute facts), where social

roles are defined by certain duties and responsibilities for the role, and with special rights carved out for individuals acting within the context of this role. The individuals that act within the context of a role must not be confused for the role itself; the role is distinct from the individual occupying the role, and the individual need not occupy the role at all moments of their existence.

Individuals may act within a role as well as acting outside of a role. To illustrate this, consider again the example of a president; presidents act within a role when presiding over the affairs of a nation, giving orders to other agents in the government, meeting foreign dignitaries, and so on, but not all actions undertaken individual who is president are actions taken in the context of the role of president. A nap during the day or a lunchtime meal are actions a president often performs as a private person. Accordingly, an action is action within a role only if it is part of the implementation of that role (e.g. if the action is performed with respect to the official duties and responsibilities of the role). Role-related actions must be realized by lower-level physical action (although the two are not identical). A president may enact legislation by signing a document, but the movement of the hand and pen across the paper is only its physical manifestation. This basic philosophical outlook is adopted in our representation.

Proposal The core of the adjective *presidential* is the noun *president*. We represent the concept for *president* as a frame, a structured representation consisting of functional attributes and their values. In our analysis, we lexically decompose the concept for *president* and model *president* as making reference to an event of leading or presiding over an institution or organization (what we label in our representation as *preside*) where a president is the agent of this event. Evidence for events in the semantics of roles comes from pairs such as *president/presidency*, where *presidency* denotes the event of being president. Examples such as those in (11) support *presidency* denoting an event.

- (11) a. Barack Obama’s presidency lasted eight years.
 b. Because his presidency occurred between those of Grover Cleveland and Theodore Roosevelt, McKinley’s accomplishments have often been overlooked. (Google)

This event of presiding is extended over time and has as its subparts the events that a president participates in during the course of their presidency. We assume that these events represent actions that take place as part of and are derived from the responsibilities of leading an organization or nation. Additionally, as the officeholder for the presidency does not stay the same over time, the role of the president as agent is separate from the person implementing the office at some particular time. IMPL maps agents of presiding events to the person implementing that role at some time *i*.

$$(12) \quad \textit{president (of the United States)} \rightsquigarrow \iota x \exists e \left[\begin{array}{l} \text{IMPL}_i(\text{AGENT}(e)) = x \wedge \\ \text{preside}(e) \wedge \text{THEME}(e) = \mathbf{USA} \end{array} \right]$$

An event nominal such as *visit* is analyzed as a predicate of events. A *presidential visit* is modeled as a visit that occurs as part of the *preside* event from *president*. The event participant role that *president* has in the *visit* event is left unspecified. Rather, we argue that the particular role is inferred from the president’s duties and responsibilities while in office. This predicts roles other than agent (such as theme) should be available for examples such as *presidential visit*, contra other accounts of RAs, such as Alexiadou & Stavrou (2011), which predict only agents should be possible. (14) shows an example that confirms this prediction, where the theme of the event of visiting (rather than the agent) is the US president.

$$(13) \quad \textit{presidential visit} \rightsquigarrow \lambda e' \exists x \exists e \left[\begin{array}{l} \text{IMPL}_i(\text{AGENT}(e)) = x \wedge \\ \text{preside}(e) \wedge \text{visit}(e') \wedge e' \sqsubseteq e \end{array} \right]$$

- (14) Will NBA champions continue to visit the White House under Donald Trump? One of the first players to make **the presidential visit** gives his opinion. (Google)

A non-event nominal is in a relation with the agent of the *preside* event rather than the event itself. In the case of *presidential desk*, the agent of *preside* is equated to the be possessor of the desk. This avoids incorrectly attributing possession to the officeholder. We surmise the uniqueness of *presidential desk* is a consequence of the uniqueness of *president*, following observations that possessors determine uniqueness for the noun phrase if the head noun is a functional concept, as is the case here (Löbner, 2011).

$$(15) \quad (the) \textit{presidential desk} \rightsquigarrow \iota y \exists x \exists e \left[\begin{array}{l} \text{IMPL}_i(\text{AGENT}(e)) = x \wedge \text{preside}(e) \wedge \\ \text{desk}(y) \wedge \underline{\text{POSSESSOR}(y) = \text{AGENT}(e)} \end{array} \right]$$

Lastly, *presidential advisor* is considered to encode an event of advising. The agent of the presiding event from *president* is asserted to be the theme of the advising, again distinguishing assertions about the role of the president from the officeholder at a particular time.

$$(16) \quad \textit{presidential advisor} \rightsquigarrow \lambda y \lambda x \exists e \exists e' \left[\begin{array}{l} \text{IMPL}_i(\text{AGENT}(e)) = x \wedge \text{preside}(e) \wedge \text{advise}(e') \wedge \\ \text{AGENT}(e') = y \wedge \underline{\text{THEME}(e') = \text{AGENT}(e)} \end{array} \right]$$

Our proposal models the observation that an individual may stop inhabiting a role (e.g., a president often stops being president at some point in time) but cannot so easily cease to be an instantiation of a natural kind (cf. Sowa (1984); Guarino (1992)). This is captured through the IMPL attribute. Additionally, the representation we propose differs crucially from the kind-based analyses we criticize in explicitly analyzing role-denoting RAs as involving reference to an event. Linguistic evidence, such as reference shifts induced by derivational morphology (cf. *president/presidency*), provide support for events at some level of representation. Putting these events into the lexical semantic model allows us to be explicit about how the semantics of the modified nominal interact with these events.

Conclusion In our analysis we distinguish the agent of presiding over an institution/nation from the its implementor. In this way, we can model why the adjective *presidential* predicates of the role corresponding to the president rather than an ordinary individual. This shows that lexical information is vital to understanding attributions with RAs; analyses that expose the lexical semantics of modifiers and modifiees offer a better chance of correctly capturing the fine-grained and manifold meanings found with RAs and how they interface with world knowledge. Our results are discussed in the context of a decompositional theory of lexical meaning that allows for subcompositional processes. And, although we focus on *presidential*, we argue that our results are generalizable to other role-adjectives such as *senatorial*, *papal*, and *royal*, providing additional insight into how natural language represents roles.

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