

On the distinction between class nouns and role nouns*

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Abstract This paper argues for a division of individual count nouns into *class nouns* (e.g., *man*) and *role nouns* (e.g., *judge*). This division, I argue, is reflected in the behavior of these nouns in three positions: (i) as the complement of *as* in *restrictive role as-phrases*, (ii) as the descriptive content of definite descriptions in a certain type of argument, and (iii) as the predicative expression of German copular clauses. To capture this behavior formally, I introduce a domain of *roles* D_r , as well as a type-shifting operator *PLAY* that connects D_r to D_e , and I propose an analysis of these contexts that accounts for their sensitivity to roles.

Keywords: class nouns, role nouns, roles, *as*-phrases, definite descriptions, copular clauses

1 Introduction

Nominal expressions are classified based on their syntactic and semantic behavior. The literature distinguishes, for instance, between individual and event nouns (e.g., Ehrich 1991), count and mass nouns (e.g., Lasersohn 2011), relational and sortal/non-relational nouns (e.g., Barker 2011), and individual-denoting and kind-denoting uses of nominal expressions (e.g., Carlson 2011).

This paper is concerned with a division within individual count nouns, which, I argue, is reflected in the contrasts between nouns like *man* and nouns like *judge* in the following three positions: (i) the complement of *as* in *restrictive role as-phrases*, as in (1), (ii) the descriptive content of definite descriptions in inferences like (2), and (iii) the predicative expression in copular clauses in German, as in (3).

As shown in (1), the use of a sentence-final nominal *as*-phrase is semantically inconspicuous in case the complement of *as* is *a judge*; the resulting sentence can be paraphrased as ‘Paul earns 3,000 euros in his judge-role’.

- (1) a. Paul earns 3,000 euros as a **judge**. (cf. Szabo 2003)
b. #Paul earns 3,000 euros as a **man**.

In contrast, the use of *man* in the same position is semantically odd, and an interpretation of (1b) parallel to that of (1a) is unavailable.

* I would like to thank Sebastian Bücking, Patrick Grosz, Edith Scheifele, Thomas Weskott, the audience at SALT 27, as well as 5 anonymous reviewers for their questions and comments.

A similar contrast between *judge* and *man* arises in (2). As Landman (1989) observes, the first premise and the conclusion of (2a) allow for an interpretation that results in invalidity of the given inference (i.e., *the judge* cannot be substituted *salva veritate* by *the hangman*). This invalidity arises regardless of the assumption in the second premise that *the judge* and *the hangman* are co-extensional. For nouns like *man*, in contrast, we observe that parallel inferences, as in (2b), are invariably valid.

- (2) a. The **judge** is on strike. (Landman 1989: 724)
 The judge is the hangman.

 ∴ The hangman is on strike.
- b. The **man** (over there) is on strike. (original example)
 The man (over there) is the hangman.

 ∴ The hangman is on strike.

Example (3) illustrates the third contrasting context: in German, it is possible to use nouns like *Richter* (Engl. ‘judge’) predicatively as a bare noun in copular clauses, as in (3a), to express that Paul’s job is being a judge or that Paul has the appropriate education to be a judge (see de Swart, Winter & Zwarts 2007 for similar data on Dutch and French among other languages). For nouns like *Mann* (Engl. ‘man’), as in (3b), omission of the indefinite determiner results in unacceptability.¹

- (3) a. Paul ist (ein) **Richter**. (German)
 Paul is a judge
- b. Paul ist ???(ein) **Mann**.
 Paul is a man

Note that the context in (3) is more restricted than the contexts in (1) and (2) in that nouns that behave like *judge* in (1a) and (2a) do not necessarily behave like *Richter* in (3a). Nevertheless, I argue, all three contexts are sensitive to the same general distinction: the distinction between *class nouns* (e.g., *man*, *cat*, *human*) and *role nouns* (e.g., *judge*, *lawyer*, *passenger*).

The aim of this paper is to defend the idea that the contrasts in (1)-(3) reveal that natural language is sensitive to whether a noun is a class noun or a role noun. This distinction, I claim, is semantic rather than pragmatic and is, thus, reflected in the denotation of these nouns. To capture this idea formally, I introduce a domain of *roles* and propose that role nouns, unlike class nouns, denote sets of roles.

The paper is structured as follows. In Section 2, I introduce my view on the distinction between class nouns and role nouns and address some conceptual difficulties. Section 3 provides further details on the contexts in (1)-(3). In addition, I

¹ German native speakers differ in their judgments regarding the well-formedness of (3b). I argue below that judgments about the acceptability of (3b) depend on how readily speakers reinterpret *Mann* in such a way that makes it similar to *Richter* (i.e., as describing roles).

discuss previous analyses of these examples, which do not make use of the class-role-distinction, and show that they cannot account for the full empirical picture. In Section 4, I revise the standardly assumed formal system to include a domain of roles and propose a formal analysis of role nouns. Section 5 then sketches analyses for the examples in (1)-(3) based on this proposal. Section 6 concludes the paper.

2 The conceptual distinction between class nouns and role nouns

In this section, I describe what I take to be the conceptual differences between class nouns and role nouns. The reason for providing this description is that there is no simple linguistic test to sharply delineate these two classes. Partee & Borschev (2012: 447) observe a similar situation for the distinction between relational and non-relational nouns: “the distinction is formally sharp [i.e., we find clear contexts that point towards the arity of the denotation of a noun – SZ], but the classification of nouns is not”. That is, in the context of nominal expressions, strict partitionings of nouns into classes (be it relational vs. non-relational or class nouns vs. role nouns) are usually not available even though we find clear grammatical and interpretational contrasts (e.g., those in (1)-(3)) that are sensitive to these partitionings.

Conceptually, the distinction between class nouns and role nouns is based on the criteria that are considered when deciding whether an individual is describable by a given noun or not.

For a class noun N_C , the decision about whether an individual is correctly described using N_C depends only on the individual’s intrinsic properties (i.e., properties that an individual bears independently of any other individual).² Properties of this kind are, for instance, height, weight, age, biological gender, or genetic make-up. For example, the class noun *man* correctly describes an individual if it is adult, biologically male, and human. Further examples for class nouns are *human*, *woman*, *child*, *animal*, *dog*, *cat*, *rabbit*, *plant*, *tree*, and *carrot*.³

For a role noun N_R , in contrast, the decision about whether an individual is correctly described by N_R depends not only on the intrinsic properties of that individual. It, crucially, also depends on external properties—properties that the individual has based on its participation in eventualities that relate it to other individuals. For instance, the role noun *judge* correctly describes an individual if he/she participates in a series of interrelated, socially determined *initiating eventualities* (e.g., going to

² This characterization of class nouns is close to the characterization of *entity categories/entity nouns* in, e.g., Gentner & Kurtz 2005 and Asmuth & Gentner 2005. It is also quite close to the philosophical notion of *sortal* (see e.g. Strawson 1959). A thorough comparison to entity categories and sortals is beyond the scope of this paper, however, and needs to be left for future work.

³ To make a connection to another strand of literature in applied ontology: class nouns seem to classify what Masolo, Vieu, Bottazzi, Catenacci, Ferrario, Gangemi & Guarino (2004) call “natural things”—*endurants* in their ground ontology.

law school). For other role nouns, the initiating eventualities are more easily named: for an individual to be correctly described by *murderer*, he/she must have killed someone in cold blood; for an individual to be correctly described by *mother*, she must have given birth to another individual; and for an individual to be correctly described by *passenger*, he/she/it must be transported in some vehicle.⁴

The examples above suggest that the subset of individuals that could in principle be described by a given role noun can be specified by a (potentially modified) class noun. For instance, only individuals that are describable by the modified class noun *adult human* could potentially also be described by *judge*. The reverse situation does not obtain. That is, the question whether an individual can be described by a class noun is conceptually more basic than and, thus, independent from its describability by some role noun.

Another property of role nouns is their *non-permanence*—i.e., whether they apply to an individual may change with time. Not only does the use of a role noun always require participation of the described individual in initiating eventualities; for some role nouns, participation in *terminating eventualities* may result in the individual not being describable by that noun any longer. For instance, if an individual ceases to be transported in some vehicle, the description as a passenger ceases to fit that individual. Similarly, an individual that can be correctly described as a student at one point in time, will usually cease to be correctly described by the noun *student* after graduation. An exception to this regularity occurs if an individual participates in the initiating eventualities for a role noun multiple times (e.g., if an individual becomes a student multiple times without graduating in between). In this case, the number of times that an individual needs to participate in the relevant terminating eventualities needs to be equal to the times that they participated in the initiating eventualities for that role noun not to apply any longer.

Finally, in case an individual participates in terminating eventualities for a role, it does not cease to exist. In other words, describability of an individual by a role noun is not connected to the individual's existence. Note that this does not preclude that some role nouns will apply to an individual until it ceases to exist (e.g., *mother* or *murderer*). For these role nouns, there are simply no terminating eventualities.

An observation that complicates the differentiation between class nouns and role nouns is that nouns that seem to be clear cases of class nouns, like *man*, may sometimes felicitously occur in positions that seem to be restricted to role nouns, for instance, the complement of *as* in a restrictive role *as*-phrase, as in (4).

(4) Paul is friendly as a man, but as a judge, he is rude.

⁴ My notion of role nouns does not fully correspond to the notion of *relational (role) categories/relational nouns* in Gentner & Kurtz 2005 and Asmuth & Gentner 2005 (which does not coincide with the notion of relational nouns in the linguistic literature!). I would, for instance, not classify *carnivore* as a role noun, although Asmuth & Gentner (2005) classify it as a relational category.

The *as*-phrase, *as a man*, in the first conjunct in (4) is the same as in (1b), where its use was judged as infelicitous. In (4), however, the use of *as a man* is fine. The reason for this is not because *man* is in fact a role noun, but because we interpret *man* in (4) as describing the role played by Paul outside from his being a judge (\approx *private person*). This reinterpretation (or maybe coercion) allows *man* to occur in restrictive role *as*-phrases and to contrast with *judge*, which always describes roles.⁵

Furthermore, nouns that describe artifacts that were created for a special purpose seem to have a double status. They describe certain objects based on their physical properties, which makes them class nouns; in addition, they can be used like role nouns to describe other entities if these are used in the same way as entities that are described by the class noun use. Consider the use of *paddle* in (5).

- (5) Unfortunately, we only had a piece of wood to steer the boat. It was a good paddle, though.

In (5), *paddle* is used in the role noun sense: the piece of wood is said to have served the function of a paddle well—although it might not have had the shape or form of an object that would be categorized as a paddle (in the class noun use).⁶

In the next section, I provide further details on the role-sensitive contexts exemplified in (1)-(3), and I show that previous analyses, which do not distinguish between class and role nouns, cannot account for the full empirical picture.

3 Revisiting the contrasts

3.1 First contrast: restrictive role *as*-phrases

The contrast given in (6) (= (1)) involves a type of non-clausal *as*-phrases, which I call “restrictive role *as*-phrases”.⁷ This label derives from two of their properties: First, potential complements of *as* are restricted to nominal expressions that describe roles that can be played by the individual associated with the *as*-phrase (i.e., the *associated individual*). Second, the *as*-phrase restricts the ascription of the property denoted by the main predicate to each of those roles played by the associated individual that are described by the *as*-complement.

- (6) a. Paul earns 3,000 euros as a **judge**.
b. #Paul earns 3,000 euros as a **man**.

⁵ In the right contexts, *man/Mann* can also be interpreted as describing roles in cases like (2b) and (3b).

⁶ I do not have any more to say about artifact nouns. All further details of this complex topic need to be left for future work.

⁷ For other types of non-clausal *as*-phrases and their characteristics see Zobel 2016, in prep a.

Example (6a) states that the associated individual, Paul, earns 3,000 euros *in his role(s) as a judge* (we, crucially, do not learn anything about Paul’s full income or his income in the other jobs that Paul is suggested to have). If Paul plays two or more judge roles (e.g., he is employed as a judge in different towns), (6a) conveys that he earns 3,000 euros in all of them (either separately or collectively). Example (6b), in contrast, is odd since *man* does not describe a role that Paul could play and to which earning 3,000 euros could be restricted.⁸

Note that the inacceptability observed for (6b) seems to disappear if the *as*-phrase is placed sentence-initially, as in (7).

(7) As a man, Paul earns 3,000 euros.

Note, though, that sentence-initial non-clausal *as*-phrases allow for two distinct interpretations, only one of which (the restrictive role use) is sensitive to role nouns. Since *man* is not a role noun, (7) only allows for the non-role-based interpretation, which is paraphrasable as ‘Paul earns 3,000 euros since he is a man’. The interpretation involving a restrictive role *as*-phrase remains unavailable sentence-initially.

The restriction placed on the *as*-complement in restrictive role *as*-phrases concerns nominal expressions in general, not only single nouns. As (8) illustrates, certain modified role nouns describe roles, while others do not; compare (8a) to (8b).

- (8) a. Paul earns 3,000 euros as a **regional judge**.
 b. #Paul earns 3,000 euros as a **young, talented judge**.

Which modifiers preserve the possibility to describe roles, is still an open question. Investigating determiner-less nominals in copular clauses (see Section 3.3), Geist (2014) suggests that the modifying adjective needs to be relational or event-related. For reasons of space, further work on this issue has to be left for future research.

Restrictive role *as*-phrases are discussed and analyzed, for instance, in Katz 1994, Jäger 2003, Szabo 2003, and Asher 2006, 2011. For reasons of space, I cannot address all of these quite different accounts; the interested reader is referred to the original works. In what follows, I briefly discuss the most recent account in Asher 2006, 2011 and address whether and how it can capture the observed sensitivity of restrictive role *as*-phrases to role nominals.

Asher (2006, 2011) assumes that restrictive role *as*-phrases contribute an *aspect* of the associated individual (\approx an “individual-under-a-conceptualization”). To capture the observation that using an *as*-phrase intuitively restricts the main predication, he further assumes that the property denoted by the main predicate is ascribed to this aspect rather than to the full individual.

⁸ I leave aside the possibility to coerce/infer a role interpretation of *man*; see Section 2.

The formal analysis of his ideas, Asher couches in the system developed in Asher 2011, which distinguishes a conceptual/internal level, which is encoded at the type level, and a logical/external level, which is represented by the truth-conditional content. He proposes that, formally, restrictive role *as*-phrases contribute (i) a new variable x of the type given by the *as*-complements, which represents the aspect to which the predicates contributed by the *as*-complement and the main predicate are ascribed, (ii) the primitive relation *o-elab*, which connects the new variable x to another variable v that represents the full individual, and (iii) a modified typing ‘?•JUDGE’ of the variable v , which conveys that the full individual has the property contributed by the *as*-complement as one of its conceptualizations. The formalization of (9a) is given in (9b); the relevant parts (i)-(iii) are underlined.

- (9) a. Paul is corrupt as a judge. (Asher 2011: 205)
 b. $\lambda\pi. \underline{\exists x : \text{JUDGE}} \exists v : \underline{? \bullet \text{JUDGE}} [[\text{Paul} = v](\pi) \wedge \underline{\text{judge}'(x, \pi)} \wedge \underline{\text{o-elab}(x, v, \pi)} \wedge \text{corrupt}'(x, \pi)]$

Asher’s analysis is problematic in two respects. For one, the introduction of a new existentially closed aspect-variable on the truth-conditional level, to my mind, forces the assumption of aspect-individuals (cf. Landman’s 1989 solution for (2) in Section 3.2), which I find undesirable. These aspect-individuals need to be distinct from the full individuals to which they are related via *o-elab* since if we were to assume that the same individual can satisfy both existential quantifications in (9b), the *as*-phrase would in fact not have any restricting effect on the logical level.⁹ The second problem, which is more pertinent to the concerns of this paper, is that Asher’s analysis does not place any restrictions on the possible complements for *as*; any one-place predicate will justify the type requirement of *as* (see Asher 2011: 205). Since *judge* and *man* both contribute one-place predicates, both should be fine in the complement of *as*. Hence, the contrast in (6) is not accounted for.

Since Asher’s type logic is very flexible regarding the introduction of new types, the restrictions on potential *as*-complements could certainly be implemented (e.g., by making *as* require an argument bearing a supertype of JUDGE that is not a supertype of MAN). Given the problem I see with the introduction of aspect-variables and aspect-individuals, I will not pursue this possibility further, though.

3.2 Second contrast: arguments involving definite descriptions with role nouns

For the inference in (10a), Landman (1989) observes that the first premise and conclusion allow for an interpretation that results in the invalidity of that inference,

⁹ I must admit that I do not fully grasp Asher’s category theoretical semantics for • types. Similarly, the discussion of *o-elab* in Asher 2011 stays rather vague. Hence, this first point of criticism needs to be taken with a grain of salt. This does not affect the following second point of criticism, though.

even if we assume that the judge and the hangman are identical. If we change Landman’s original example and substitute *the man* for *the judge*, as in (10b), the resulting inference does not behave the same way: the premises in (10b) always allow us to conclude that the hangman is on strike.¹⁰

- (10) a. The **judge** is on strike. (Landman 1989: 724)
 The judge is the hangman.

 ∴ The hangman is on strike.
- b. The **man** (over there) is on strike. (original example)
 The man (over there) is the hangman.

 ∴ The hangman is on strike.

Landman (1989) assumes that the first premise and the conclusion in (10a) are interpreted as in (11). That is, in the relevant interpretation of the two sentences, we understand the ascription of *be on strike* to the individual denoted by *the judge* and *the hangman* as restricted to that individual’s judge-aspect and hangman-aspect, respectively (i.e., (11) contains restrictive role *as*-phrases, see Section 3.1).

- (11) a. The judge, as a judge, is on strike. (see Landman 1989: 729ff)
 b. The hangman, as a hangman, is on strike.

Formally, Landman proposes to analyze *the judge* in the first premise and *the hangman* in the conclusion of (10a) as introducing *restricted terms*: *the judge* and *the hangman* are analyzed as $x \upharpoonright J$ (i.e., *x-as-a-judge*) and $x \upharpoonright H$ (i.e., *x-as-a-hangman*), where x is the individual that is the judge and the hangman, and J , H are the properties denoted by *judge* and *hangman*, respectively. In set-theoretic terms, $x \upharpoonright J$ and $x \upharpoonright H$ are those sets of properties that x has in the roles described by J and H .¹¹ The introduction of restricted terms accounts for the invalidity of (10a): since the sets denoted by $x \upharpoonright J$ and $x \upharpoonright H$ are not related in any principled way, the property denoted by *is on strike* can be a member of $x \upharpoonright J$ without being a member of $x \upharpoonright H$.

If we assume that the second premise in (10b) establishes $\iota y[M(y)] = \iota y[H(y)] = x$,¹² the valid inference in (10b) can be accounted for by assuming that *the man* and

¹⁰ Note that the first premise and conclusion of (10a) can also be interpreted in such a way that the inference is valid, just like (10b). The analysis I propose in Section 5.2 captures this.

¹¹ Landman never explicitly states whether term restriction is the result of a covert *as*-phrase (as suggested by (11)) or whether definite descriptions can denote restricted terms by themselves.

¹² For the second premise in (10a) to be interpretable in the intended way (i.e., as $\iota y[J(y)] = \iota y[H(y)] = x$), *the judge* and *the hangman* need to be ambiguous between $x \upharpoonright J$, $x \upharpoonright H$ and $\iota y[J(y)]$, $\iota y[H(y)]$. Note that if we were to assume that *The judge is the hangman* denotes $x \upharpoonright J = x \upharpoonright H$, (10a) should be valid. And formalizing *The judge is the hangman* as $x \upharpoonright J(\lambda x.x = \iota y[H(y)])$ would not only require *the hangman* to be ambiguous, but also convey that being the hangman is a property of x in his role as a judge, which, I believe, *The judge is the hangman* does not express.

the hangman do not contribute restricted terms but are interpreted conventionally as $\iota y[M(y)]$ and $\iota y[H(y)]$ (i.e., as picking out x , which is the man and hangman). As a result, the first premise and the conclusion are truth-conditionally identical, and (10b) straightforwardly comes out as valid.

While Landman’s proposal can account for the invalidity of (10a) and is compatible with a straightforward account of (10b), it remains unclear why (10b) does not show the same ambiguity as (10a)—i.e., why *the man* cannot introduce a restricted term $x \upharpoonright M$.¹³ I argue that the ambiguity found for (10a) arises because *is on strike* in the first premise and the conclusion are sensitive to the distinction between class nouns and role nouns. A formal sketch of this idea is given in Section 5.2.

3.3 Third contrast: bare singular role nouns in copular clauses

The final context that distinguishes role nouns like *Richter* (Engl. ‘judge’) from class nouns like *Mann* (Engl. ‘man’) is given in (12) (= (3)). We observe that in German, the role noun *Richter* may occur predicatively without an indefinite determiner, while a determiner-less predicative use is degraded for the class noun *Mann* and is only marginally acceptable if *Mann* is reinterpreted as a role noun (see Section 2).

- (12) a. Paul ist (ein) Richter. (German)
 Paul is a judge
 b. Paul ist ???(ein) Mann.
 Paul is a man

The determiner-less version of (12a) expresses that Paul’s job is being a judge or that he was educated to perform this job. The version of (12a) containing an indefinite determiner may additionally express that Paul has traits that we usually associate with judges even though he is potentially not a judge (see de Swart et al. 2007, Geist 2014). The non-degraded version of (12b) containing *ein Mann*, in contrast, simply expresses that Paul has the property of being a man.

As stated in the introduction, this context is more restrictive than those discussed in Sections 3.1 and 3.2 in that only a subset of role nouns (including *Richter*) readily allow for the omission of the indefinite determiner. We, for instance, observe that using the role nouns *Passagier* (Engl. ‘passenger’) and *Mörder* (Engl. ‘murderer’) in (13) without a determiner is not straightforwardly possible.

- (13) a. Paul ist ??(ein) Passagier.
 Paul ist a passenger

¹³ Further, unrelated problems for Landman’s term restriction proposal have been identified in Fox 1993, Szabo 2003, Jäger 2003, and Asher 2006, 2011. I refer the interested reader to these works.

- b. Paul ist ??(ein) Mörder.
Paul is a murderer

Omission of the indefinite determiner in (13) intuitively results in sentences that, interpreted out-of-the-blue, express that passenger and murderer are professions, and that Paul has these professions. To express that Paul is a passenger or has killed someone, the use of an indefinite determiner is preferred.¹⁴

For Dutch and German, respectively, *de Swart et al. (2007)* and *Geist (2014)* suggest that omission of the indefinite determiner is only possible for nouns that “usually have human referents and describe professions, religions, nationalities or other roles in society” (*de Swart et al. 2007: 195*). While this characterization fits the contrast in (12) and (13), matters (at least in German) are more complicated. For instance, omission of the determiner in (13) improves if (i) the context provides concrete circumstances that determine a specific instance of being a passenger or murderer, or (ii) the noun is modified to specify these circumstances; see (14).¹⁵

- (14) a. Paul ist heute Passagier.
Paul is today passenger
- b. Paul ist Passagier auf der Titanic/der Lufthansa.
Paul is passenger on the Titanic/the.GEN Lufthansa

Heute (Engl. ‘today’) in (14a) and *auf der Titanic* (Engl. ‘on the Titanic’) and *der Lufthansa* (Engl. ‘of Lufthansa’) in (14b) specify that these sentences describe specific instances of Paul being a passenger rather than general facts about Paul. While this is a promising first step, determining the exact conditions on the determiner-less use in German is beyond the scope of this paper and is, hence, left for future work.

Compared to German, omission of the indefinite determiner in English copular clauses is more restricted: a bare use is only available for nominal expressions that describe single roles, like *chair of the committee* in (15) (cf. *de Swart et al. 2007*).¹⁶

- (15) Sue is chair of the committee. (*de Swart et al. 2007: 219*)

To account for the bare predicative use of the mentioned subset of (role) nouns, *de Swart et al. (2007)* introduce a new type of single entity, which they call “capaci-

14 Compare (13b) to (i) containing the more profession-like *Auftragsmörder* (Engl. ‘contract killer’).

- (i) Paul ist (ein) Auftragsmörder.
Paul is a contract-killer

15 I thank Sebastian Bücking, Patrick Grosz, and Thomas Weskott (p.c.) for these examples and related discussion.

16 Note that singularity of the role described by the nominal expression does not require that only a single individual plays this role, see example (19) in Section 4.1.

ties”. Formally, capacities bear the sortally restricted type e_C (different from e_K for kinds); hence, the set of capacities is a subset of D_e .

For those nouns that can occur determiner-less in copula clauses, de Swart et al. propose that they denote specific, single capacities; see (16).

$$(16) \quad \llbracket \text{Richter} \rrbracket = \text{judge}' \quad (\text{with judge}' \in D_{e_C})$$

Since the denotation in (16) cannot directly compose with an individual-denoting subject, the bare occurrence of *Richter* in a copular clause is shifted via the operator CAP to a set of individuals. When *Richter* occurs with an indefinite determiner, its denotation is first shifted to the corresponding kind, which is then shifted via REL to the set of its members (i.e., individuals describable as a judge on any grounds).

The contrast between (12a) and (12b) is accounted for by assuming that nouns like *Mann* denote kinds, which cannot be shifted to sets of individuals using CAP. The kind denoted by *Mann* can only be shifted to a set of individuals via the operator REL. Since the authors assume that REL is tied to specification for number and that number-marked nominals obligatorily co-occur with determiners, *Mann*—unlike *Richter*—obligatorily co-occurs with a determiner.

While the general idea behind de Swart et al.’s 2007 solution fits well with the general direction of my own account (see Section 4), assuming that all role nouns denote capacities is not an option (although capacity-denoting nouns are a subset of the set of role nouns). As shown above, there are role nouns, like *passenger* and *murderer*, that cannot readily occur bare in German copular clauses. Conversely, role nouns of any kind can occur in sentences involving restrictive role *as*-phrases, as in (17), and can give rise to invalid inferences of the type in (18) for *murderer*.¹⁷

- (17) a. Paul is considerate as a passenger.
 b. Paul was sentenced to a lifetime in prison as a murderer.
- (18) Mary’s murderer was sentenced to a lifetime in prison.
 Mary’s murderer is the thief who stole Peter’s dog.

 ∴ The thief who stole Peter’s dog was sentenced to a lifetime in prison.

Hence, to capture the contrast between class and role nouns in general, we need a less restrictive notion. This, I propose, is the notion of *roles*.

4 The formal distinction between class nouns and role nouns

The main formal claim of this paper is that the distinct behavior of class nouns and role nouns, as described in Section 3, is not only conceptual (i.e., the result of a

¹⁷ Like the inference in (10a), the first premise and conclusion of (18) also allow for a reading under which the inference is valid. What is important for our purposes is that there is an interpretation under which the inference is invalid.

world-knowledge-based distinction between the concepts connected to these nouns) but is reflected in the semantic contribution of these nouns. Specifically, I assume that the basic denotation of role nouns is a predicate of *roles* instead of a predicate of (regular) individuals, which is the basic denotation of class nouns (as standardly assumed in the literature).

Before I formally spell out this idea in Section 4.2, I introduce four characteristics of roles, which further motivate the introduction of an independent domain of roles, and I present linguistic examples that show that these characteristics are reflected in the way we talk about roles.

4.1 Roles as independent entities

The assumption that role nouns denote sets of roles is inspired by the literature on roles in various branches of theoretical computer science and their interfaces with linguistics, philosophy, and sociology (e.g., applied ontology, conceptual modelling, and knowledge representation) (see e.g., Sowa 1984, Steimann 2007, Masolo et al. 2004, Loebe 2007). In this literature, roles are seen as *sui generis* ontological objects that must not be identified with the individuals that bear them (i.e., their “players”). Compelling reasons for this assumption are (among others) (i) that one and the same role can be played by multiple individuals (also simultaneously), (ii) that roles do not have to be played by any individual, (iii) that roles can have properties that do not apply to their players, and (iv) that the players have certain properties only as a result of playing the relevant role.

In the remainder of this subsection, I show that this independence between roles and their players is reflected by how we talk about them. Point (i) (multiple players for one role) is reflected in the possibility to have predicatively used bare singular role nouns (see Section 3.3) with plural subjects in copular clauses, as in (19).^{18,19}

- (19) The three core players and their organizations are **executive director of the Tri-County regional planning commission**.
(COCA: Journal of Environmental Health 2008)

Point (ii) (possible lack of a player) is reflected in the possibility to have copular clauses that contain negative existential quantifiers in subject position and predicatively used bare singular role nouns, as in (20).

¹⁸ Examples tagged “COCA” are from the Corpus of Contemporary American English (Davies 2008-).

¹⁹ Another example taken from the web is given in (i).

- (i) He and I are **manager of the Los Angeles Chapter of the community**.
(<https://de.linkedin.com/in/fortinjulien> (accessed: Aug 12, 2017))

- (20) I long for the day when no one is **head of the house**.
(COCA: Essence 2007)

Point (iii) (roles have their own properties) is reflected in the possibility to have role-denoting expressions in subject position of a copular clause. So far, we have only seen role nouns in predicative position (i.e., inside *as*-phrases and copular clauses), where, I argue, they do not denote specific roles but a set of roles. To talk about a specific role (played by an individual *X*), we need to use expressions of the type *the/X's role/job (as DP/NP)*.²⁰ Consider the copular clause in (21).

- (21) I submit that **this role** is outmoded and dangerous.
(COCA: ABA Journal 2003)

In (21), we ascribe the properties of being outmoded and dangerous to a role—crucially, without claiming that the player of this role has either property.

Lastly, point (iv) (players have properties as a result of their roles) concerns the fact that some roles come with duties, obligations, and rights, which are transferred to their players and are lost as soon as these individuals cease to play these roles. For instance, as a politician of a certain party, an individual may be bound to party policy and general rules of conduct connected to the role as a politician/member of that party. These rules cease to be in effect if he/she puts down that role. As shown in Section 3.1, sentences with restrictive role *as*-phrases are used to ascribe properties to an individual in a role. These sentences are also used to communicate properties of an individual that are a result of playing a role, as in (22).

- (22) He's a politician; I'm a pastor. [...] And he says what he has to say **as a politician**. I say what I have to say **as a pastor**.
(COCA: Meet the Press 10:00 AM EST NBC 2008)

The free relative clauses in (22) convey that the contents asserted by the speaker and the person denoted by *he* are bound to attitudes that are required by the politician- and pastor-roles—it is also suggested that they might have uttered something different outside these roles (e.g., as private persons).

²⁰ As stated in Section 3.1, nominal *as*-phrases that occur adjoined to a verbal/functional projection are ambiguous between (at least) (i) the restrictive role use and (ii) a non-role-based interpretation. The same ambiguity can be observed for *as*-phrases occurring inside DPs (see e.g., Alexiadou 2001 and Bücking 2012 on the observation that modifiers in the nominal domain show the same functional variance as in the verbal domain). Hence, an expression like *Paul's role as a judge* either describes (i) the specific judge-role played by Paul or (ii) another role played by Paul that he has because he is a judge. Here, I am only interested in option (i).

4.2 Formalization of role nouns

As stated in the beginning of this section, I propose to introduce a domain of roles into the formal system and let role nouns denote predicates of roles. For reasons of simplicity, and since integration of worlds/situations and times is not crucial for the phenomena discussed above, the following proposal is kept extensional. I also set aside the well-known ambiguity of nominal expressions between a predicate-based and a kind-based denotation (see e.g., Dayal 2011).

I assume that we have the semantic types given in (23) at our disposal.

- (23) a. Basic types: e (individuals), v (eventualities), r (roles), t (truth values)
 b. Function types: if α and β are types, then $\langle \alpha, \beta \rangle$ is a type.

For each basic type as well as all function types, there are domains containing the extensions of the relevant type. Hence, D_r is the *domain of roles*. The members of this set are specific single roles that exist independently from potential players.

On the level of extensions, I propose that the difference between class nouns, like *man*, and role nouns, like *judge*, boils down to the type of predicate they denote. While class nouns are of type $\langle e, t \rangle$, denoting sets of individuals as in (24a), role nouns are of type $\langle r, t \rangle$, denoting sets of roles as in (24b).

- (24) a. $\llbracket \textit{man} \rrbracket = \lambda x_e. \textit{man}'(x)$ $(\in D_{\langle e, t \rangle})$
 b. $\llbracket \textit{judge} \rrbracket = \lambda r_r. \textit{judge}'(r)$ $(\in D_{\langle r, t \rangle})$

I assume that D_r and D_e are connected via a type-shifting operator, PLAY, which for a given role noun, returns the set of individuals that play the roles described by that role noun. The operator is formally defined in (25).

- (25) $\llbracket \text{PLAY} \rrbracket^{\mathcal{R}} = \lambda P_{\langle r, t \rangle}. \lambda x_e. \exists r \exists e [P(r) \wedge \langle r, e \rangle \in \mathcal{R}_x]$

IN PROSE: PLAY requires a set of roles P and returns a set of individuals x for which there are a role r and an eventuality e such that r is a P -role, and $\langle r, e \rangle$ is part of the specific role structure \mathcal{R}_x of x .

The definition in (25) makes use of the notion of a *role structure* \mathcal{R} , which, I assume, is an interpretational parameter that is accessed when we talk about the roles of individuals. The full role structure \mathcal{R} is a function from D_e to *specific role structures*, which intuitively provide non-mereological structures on individuals by structuring their participation in eventualities relative to their roles.²¹

²¹ This idea is inspired by Landman's (1989) "aspects" of an individual (see Section 3.2), as well as Asher's (2006; 2011) idea that we need to be able to access conceptualizations of non-mereological parts of an individual (see Section 3.1). The idea that the analysis of restrictive role *as*-phrases requires non-mereological parthood can, on a different level, also be found in Szabo 2003.

- (26) For each individual x , the *specific role structure* \mathcal{R}_x is a set of role-eventuality-pairs. A pair $\langle r, e \rangle$ is a member of \mathcal{R}_x iff x is a participant of e in r .

I understand x being a participant of an eventuality e as x standing in a thematic relation to e , and I assume x 's participation in e to be *in a role* r if x 's participation is associated with x 's playing that role. This is the case, if x 's participation is subject to the duties, obligations, and rights connected to r . Obviously, much more needs to be said on this matter. For reasons of space, I need to leave it at this rather intuitive level and to defer a more detailed discussion to future work.

In Section 5, I sketch how the assumption of D_r , the type-shifting operator PLAY, and the role structure \mathcal{R} can be used to model the examples discussed in Section 3.

5 Modelling the data using roles

5.1 Restrictive role *as*-phrases: *Paul is corrupt as a judge*

As shown in Section 3.1, restrictive role *as*-phrases signal that ascription of the denotation of the main predicate to the associated individual is restricted: the main predicate is ascribed only in those roles played by the associated individual that are described by the *as*-complement. For instance, *Paul is corrupt as a judge* conveys that Paul is corrupt in all of the judge-roles played by Paul.

Using the formal tools introduced above, this restricted ascription can be captured as follows. I take ‘‘ascription of a property denoted by a predicate to an individual’’ to translate (in standard Davidsonian manner) into participation of that individual in an eventuality described by that predicate. As a result of this assumption, I can make use of the role structure \mathcal{R} to model restricted ascription: an individual x participating in an eventuality e in a role r translates into $\langle r, e \rangle \in \mathcal{R}_x$.

Since the *as*-phrase signals restricted ascription to all roles r played by the associated individual x that are described by the *as*-complement P , I assume (i) *as* introduces universal quantification over all P -roles played by x , and (ii) *as* conveys that x 's participation in the eventuality e described by the main predicate Q is restricted to each of these roles r . In sum, we obtain the denotation of *as* in (27).²²

$$(27) \quad \llbracket as \rrbracket^{\mathcal{R}} = \lambda P_{\langle r, t \rangle} . \lambda Q_{\langle e, vt \rangle} . \lambda x_e . \lambda e_v . \\ \forall r [(P(r) \wedge \exists e' [\langle r, e' \rangle \in \mathcal{R}_x]) \rightarrow (\langle r, e \rangle \in \mathcal{R}_x \wedge Q(x)(e))]$$

The restriction of *as* to expressions describing roles is captured by requiring the *as*-complement P to be of type $\langle r, t \rangle$. Hence, class nouns, which are of type $\langle e, t \rangle$, cannot directly combine with *as*.

²² That an individual x plays a specific role r , is expressed as $\exists e' [\langle r, e' \rangle \in \mathcal{R}_x]$. That is, x plays r iff there is at least one eventuality e' in which x participates in r .

Following Heim & Kratzer (1998), I assume that the indefinite determiner found in predicative indefinite DPs is an identity function for one-place predicates of any type. Hence, $\llbracket a \text{ judge} \rrbracket^{\mathcal{R}} = \llbracket \text{judge} \rrbracket^{\mathcal{R}}$, which can directly combine with *as*.²³ Using a Davidsonian analysis for the predicate *to be corrupt*, we obtain the truth conditions in (28) for the sentence *Paul is corrupt as a judge*.

- (28) $\llbracket \text{Paul is corrupt as a judge} \rrbracket^{\mathcal{R}} =$
 $\exists e \forall r [(\text{judge}'(r) \wedge \exists e' [\langle r, e' \rangle \in \mathcal{R}_{\text{Paul}}]) \rightarrow (\langle r, e \rangle \in \mathcal{R}_{\text{Paul}} \wedge \text{corrupt}'(\text{Paul})(e))]$
 IN PROSE: *Paul is corrupt as a judge* is true iff is an eventuality e such that for all judge-roles r played by Paul, $\langle r, e \rangle$ is part of Paul's role structure $\mathcal{R}_{\text{Paul}}$, and e is a being-corrupt-eventuality of Paul.

For a more detailed analysis of restrictive role *as*-phrases see Zobel in prep b.

5.2 Invalid inferences with role nouns: *The judge is on strike*

To account for the interpretation of the first premise and consequence of (29) (=10a) that results in an invalid inference, I propose that *is on strike* is intuitively and formally sensitive to roles: the participant x of the *is-on-strike*-eventuality e is lexically determined to participate in e in a contextually provided role r_i , see (30).

- (29) The judge is on strike. (Landman 1989: 724)
 The judge is the hangman.

 ∴ The hangman is on strike.

- (30) $\llbracket \text{is on strike} \rrbracket^{\mathcal{R},s} = \lambda x_e. \lambda e_v. \text{on-strike}'(x)(e) \wedge \langle g(r_i), e \rangle \in \mathcal{R}_x$

This claim is supported by the fact that if we substitute *is on strike* with a predicate that is intuitively not sensitive to roles, like *is tall*, the resulting inference does not have a parallel interpretation that makes it invalid, see (31).

- (31) The judge is tall.
 The judge is the hangman.

 ∴ The hangman is tall.

The proposal for *is on strike* in (30) accounts for (29) as follows. Since definite descriptions with role nouns, like those with class nouns, denote single individuals (see Section 3.2), I propose that the argument of the definite determiner is restricted to expressions of type $\langle e, t \rangle$.²⁴ Hence, for the definite determiner to combine with a role noun, the role noun has to be type-shifted to an expression of type $\langle e, t \rangle$ via the operator PLAY. As a result, *the judge* has the denotation of type e given in (32).

²³ How this semantics of the indefinite determiner fits with the observations about bare and non-bare predicative nominals in German is addressed in Section 5.3.

²⁴ For reasons of simplicity, I leave aside event nouns and nouns like *role* and *job*.

$$(32) \quad \llbracket \text{the judge} \rrbracket^{\mathcal{R}} = \llbracket \text{the} \rrbracket^{\mathcal{R}} (\text{PLAY}(\llbracket \text{judge} \rrbracket^{\mathcal{R}})) = \iota x [\exists r \exists e [\text{judge}'(r) \wedge \langle r, e \rangle \in \mathcal{R}_x]]$$

If we combine (30) and (32), we obtain the truth conditions for *The judge is on strike* in (33), for which the contextually provided role r_i is still to be specified.

$$(33) \quad \llbracket \text{the judge is on strike} \rrbracket^{\mathcal{R},g} = 1 \text{ iff} \\ \exists e [\text{o-s}'(\iota x [\exists r \exists e [\text{j}'(r) \wedge \langle r, e \rangle \in \mathcal{R}_x]])(e) \wedge \langle \mathbf{g}(\mathbf{r}_i), e \rangle \in \mathcal{R}_{\iota x [\exists r \exists e [\text{j}'(r) \wedge \langle r, e \rangle \in \mathcal{R}_x]]}]$$

As a result of PLAY, *the judge* makes salient a judge-role played by the participant of e . Following Maienborn (2003) on the preferred instantiation of free variables, I suggest that r_i in (33) is fixed via the variable assignment g as this judge-role. Similarly, in the conclusion of (29), *the hangman* makes salient a hangman-role. If this newly introduced hangman-role is assigned to r_i in the conclusion, *is on strike* in the first premise and the conclusion will depend on different roles. As a result, the inference is blocked since the resulting predicates describe potentially different sets of individuals, and the participant of e may be a member of one but not the other.²⁵

In case the definite description in the first premise of the argument contains a class-noun-based definite description, like *the man (over there)* in (10b), no role will be made salient, and the value of r_i will be set to some arbitrary role borne by the individual denoted by the definite description (assuming the argument is presented out of context). Hence, when the conclusion makes salient some role of that individual, that arbitrary role can be identified with this role. This results in identical predicates in the first premise and conclusion, as well as a valid inference.

5.3 Predicatively used bare singular role nouns in German: *Paul ist Richter*

The possibility for certain role nouns to occur bare in German copular clauses, I attribute to the presence of a silent determiner/operator REST. This operator takes a role noun and restricts its denotation to those roles that correspond to de Swart et al.'s (2007) “capacities”. For a role noun like *Richter* (Engl. ‘judge’), the restricted set of roles, $\text{judge}'_{\text{rest}}$, will be non-empty. Role nouns that cannot occur bare, I assume, denote sets of roles that do not contain roles corresponding to capacities. Hence, application of REST will return the empty set, which blocks a bare use.²⁶

To model sentences like *Paul ist Richter* (Engl. ‘Paul is a judge’), I assume that the copula is an identity function (see Heim & Kratzer 1998), which, just like the definite determiner, is restricted to predicates of type $\langle e, t \rangle$. Hence, predicative expressions of type $\langle r, t \rangle$ need to be shifted to predicates of type $\langle e, t \rangle$ via PLAY.

²⁵ Note that r_i in the conclusion can also take up the previously introduced judge-role. In this case, the premise and conclusion will depend on the same role and, hence, contain the same predicate. In this case, the inference will be judged as valid.

²⁶ As observed in Section 3.3, the exact conditions on the use of bare nouns in German copular clauses are still an open question. Any restricting conditions will translate into conditions on the use of REST.

Combining the application of REST and PLAY, the denotation of the bare singular role noun *Richter* is shifted to the denotation in (34). After combining (34) with the copula and the subject, *Paul*, the truth conditions of *Paul ist Richter* are as in (35).²⁷

$$(34) \quad \llbracket \text{PLAY REST } Richter \rrbracket^{\mathcal{R}} = \lambda x_e. \exists r \exists e [\text{judge}'_{\text{rest}}(r) \wedge \langle r, e \rangle \in \mathcal{R}_x]$$

$$(35) \quad \llbracket Paul \text{ ist PLAY REST } Richter \rrbracket^{\mathcal{R}} = 1 \text{ iff } \exists r \exists e [\text{judge}'_{\text{rest}}(r) \wedge \langle r, e \rangle \in \mathcal{R}_{\text{Paul}}]$$

IN PROSE: There is a capacity-like-judge-role r and an eventuality e such that $\langle r, e \rangle$ is part of Paul's role structure.

In case a role noun occurs with an indefinite determiner, the application of REST is blocked. As assumed in Section 5.1, I take the denotation of an indefinite predicative DP to be identical to the denotation of the nominal expression contained in it (i.e., $\llbracket \text{ein Richter} \rrbracket^{\mathcal{R}} = \llbracket Richter \rrbracket^{\mathcal{R}}$). As a result, PLAY (required by the copula) will shift the full denotation of the role noun, including all non-capacity-like judge-roles. The resulting truth conditions of *Paul ist ein Richter* are given in (36).

$$(36) \quad \llbracket Paul \text{ ist PLAY ein Richter} \rrbracket^{\mathcal{R}} = 1 \text{ iff } \exists r \exists e [\text{judge}'(r) \wedge \langle r, e \rangle \in \mathcal{R}_{\text{Paul}}]$$

IN PROSE: There is a (potentially non-capacity-like) judge-role r and an eventuality e such that $\langle r, e \rangle$ is part of Paul's role structure.

Class nouns cannot occur bare since the silent determiner REST is not defined for sets of individuals. Hence, the only possibility for DPs containing nouns like *Mann* (Engl. 'man') to occur in copular clauses is with an (in)definite determiner.

6 Conclusion

In this paper, I argued that natural language is sensitive to the distinction between class nouns and role nouns. I discussed the diverging morphosyntactic and semantic effects of class nouns vs. role nouns in three contexts and reviewed previous analyses of these contexts that do not assume a class-role distinction. Based on this discussion, I proposed that the difference between class nouns and role nouns is semantic rather than pragmatic in nature.

To capture this semantic distinction, I extended the formal system and added (i) a domain of roles (D_r), (ii) a type-shifting operator PLAY, which connects D_r to the domain of individuals D_e , and (iii) the role structure \mathcal{R} , which for each individual x , provides a non-mereological structure on x . These formal tools were then used to sketch an analysis of these three contexts that accounts for the different behavior of class and role nouns in them.

²⁷ This greatly simplifies the contribution of the copula and ignores tense and aspect of copular clauses. A full account of these clauses, of course, needs to be able to capture these facts.

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Class nouns vs. role nouns

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