Counterfactual Donkey Sentences: A Response to
Robert van Rooij

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Abstract
Robert van Rooij (2006) proposed an analysis of counterfactual donkey sentences by combining the Stalnaker–Lewis analysis of counterfactuals with standard dynamic semantics. This paper points out some problems with van Rooij’s treatment of counterfactual sentences in the language of first-order logic and provides a new interpretation using dynamic semantics.

1 VAN ROOIJ’S THEORY OF COUNTERFACTUAL DONKEY SENTENCES
To analyse the interplay of indefinites, pronouns and epistemic modalities, Groenendijk et al. (1996) provide a dynamic semantics for a language of first-order modal predicate logic. This approach differs from the traditional static one in that the meaning of a sentence is identified with its context change potential rather than with its truth conditions. Or, as Robert van Rooij puts it:

‘According to the alternative dynamic view, we interpret sentences with respect to a context that is represented by a set of world-assignment pairs, and the meaning of the sentence itself can be thought of as the update of this context, where possibilities are eliminated when the sentence is false, and the assignment of the possibilities is enriched if a new variable, or discourse referent, is introduced by way of an indefinites.’ van Rooij (2006: 391)

One of the characteristics of this dynamic system is the following equivalence:

\[(\exists x P_x) \rightarrow Q_x \equiv \forall x (P_x \rightarrow Q_x)\]

1 See Groenendijk et al. (1996: 198).
This equivalence makes it possible to translate donkey sentences into logical formulae corresponding to their surface structures. Thus, donkey sentences can be interpreted in a compositional way.

However, donkey sentences do not only show up in the indicative mood, in which case they can be analysed using material implication; we have counterfactual donkey sentences as well. For instance,

(1) If John owned a donkey, he would beat it.

In order to deal with sentences like (1), a straightforward idea is to extend the dynamic system for modal predicate logic with counterfactuals. This is exactly what van Rooij did in van Rooij (2006):

‘... we would like to represent (1) abstractly as \((\exists xPx) \rightarrow Qx\), while still being equivalent with \(\forall x(Px \rightarrow Qx)\). The challenge is to account for this equivalence, without giving up our standard dynamic account of indefinites.'² (van Rooij 2006: 391)

To achieve this goal, van Rooij’s basic idea is to combine the Stalnaker–Lewis analysis of counterfactuals with the system of dynamic semantics that we just mentioned.

More precisely, first, based on the comparative similarity relation between worlds \(\leq_w\) used by Lewis–Stalnaker, van Rooij defined the comparative similarity relation \(\leq_{(w,g)}\) between world–assignment pairs as follows:

\[
\langle w', g \rangle \leq_{(w,g)} \langle w'', g'' \rangle \text{ iff } w' \leq_w w'', g', g'' \supseteq g \text{ and } g' = g''.
\]

According to this definition, two possibilities are comparable to \(\langle w', g \rangle\) just in case their assignments coincide and extend \(g. w' \leq_w w''\) is read as ‘\(w'\) is closer to \(w\) than \(w''\). Likewise, \(\langle w', g \rangle \leq_{(w,g)} \langle w'', g'' \rangle\) is read as ‘\(\langle w', g \rangle\) is closer to \(\langle w, g \rangle\) than \(\langle w'', g'' \rangle\). Then, in line with the Stalnaker–Lewis definition of selection functions, van Rooij defined the selection function \(f^*\) from sets of world–assignment pairs to sets of world–assignment pairs as follows:

\[
\langle /\phi /\rangle_{(w,g)} = \{ \langle w', g \rangle \in /\phi /\rangle: \text{ for all the } \langle w'', g'' \rangle \in /\phi /\rangle, \langle w', g \rangle \leq_{(w,g)} \langle w'', g'' \rangle \text{, where } /\phi /\rangle = [\phi] \{ \langle w', g \rangle: w' \in W \text{ & } g' = g \}.\]

Roughly speaking, \( /\phi /\rangle_{(w,g)}\) stands for the set of the world–assignment pairs in which \(\phi\) can be verified. Here the basic idea is that a selection

² In van Rooij (2006), ‘>’ is used to represent the counterfactual connective. To unify the symbols in this paper, here we change all ‘>’ into ‘\(\rightarrow\)’.
³ See Definition 1 in van Rooij (2006).
⁴ See Definition 2 in van Rooij (2006).
function selects the closest antecedent possibilities based on the comparative similarity relation between world–assignment pairs which was defined earlier. Finally, just like Stalnaker–Lewis definition of the truth condition of a counterfactual, a counterfactual is defined to be true if its consequent can also be verified in these selected antecedent possibilities.

The main result in van Rooij’s extended dynamic system is that the following equivalence in counterfactual mood holds:

\[(\exists xPx) \sim Qx \equiv \forall x(Px \sim Qx)\]

This is exactly what he wanted to achieve. Consequently, he concluded that counterfactual donkey sentences can be interpreted in a natural and compositional way just like indicative counterfactuals.

However, the above equivalence has its weaknesses. van Rooij himself points out that it cannot be applied to two particular types of counterfactuals: identification counterfactuals like (2) and weak counterfactual donkey sentences like (3).

(2) If Alex were married to a girl from his class, it would be Sue.

(3) If I had a quarter in my pocket, I would throw it into the meter.

According to van Rooij, the characteristic feature of identification counterfactual donkey sentences is that the indefinites in such sentences do not really introduce discourse referents; the reason for calling (3) ‘weak’ is that it does not require the speaker to put every quarter into the parking meter at a world where he has more than one quarter in his pocket.

According to van Rooij, the reason why these two special types of examples fail to satisfy the above equivalence is obvious. It is too strong to say that (2) is true just in case for any individual, if that individual were from Alex’s class and married to him, it would be Sue, and the same also applies to (3). Given this, van Rooij has to find a way to avoid this strong reading. The trick he uses is first to introduce a set of variables X showing which variables in the antecedent are unselectively bound and then to define the comparative similarity relation \(\preceq^{*,X}_{(w,\eta)}\) between world–assignment pairs as follows:

\[\langle w',g'\rangle \preceq^{*,X}_{(w,\eta)} \langle w'',g''\rangle \text{ iff } w' \preceq_w w'', g', g'' \supseteq g \text{ and } g' \uparrow^X = g'' \uparrow^X.\]

\(g' \uparrow^X\) and \(g'' \uparrow^X\) in the above definition stand for the restriction of \(g'\) and \(g''\) to \(X\), respectively. Finally, by redefining the selection function

5 See Definition 3 in van Rooij (2006).
based on the current similarity relation \( \preceq^*_w \) in the same way as he did before, van Rooij claims that (2) can be predicted as expected if it is represented in such a way that \( X = \emptyset \) just in case Alex is married to Sue (and only Sue) in the world closest to the actual one among the worlds where Alex is married to a girl from his class. His account of (3) proceeds along similar lines, but I will not describe it in detail here. In section 2, I hope to show that there is no need to think of (2) or (3) as special cases.

2 PROBLEMS

Van Rooij believes that weak counterfactual donkey sentences are the exception rather than the rule. Generally speaking, a counterfactual donkey sentence is equivalent to a formula with wide scope universal quantification. Unfortunately, he does not supply an independent, syntactic criterion that tells us when we are dealing with an exceptional case. This means that classifying an example as ‘weak’ becomes an ad hoc decision, if not just a way to save his theory from falsification.

Below, I will defend the view that the equivalence between \( (\exists x P x) \rightarrow Q x \) and \( \forall x (P x \rightarrow Q x) \) does not in general hold. There is no need to make a distinction between weak and strong counterfactual donkeys.

Let us first take a look at the following scenario:

Scenario. There is one tiger \( t \) and one lion \( l \) in the zoo. Now it is found that the cage for \( t \) is open, but fortunately \( t \) is still sitting in it, and \( l \) is sitting in its own closed cage.

Now the question is: would you accept the following sentence?

\[
(4) \text{ If an animal had escaped, it would have been a tiger.}
\]

The answer seems to be ‘yes’. Because the cage for \( t \) is open, while the one for \( l \) is closed, it is very unlikely that \( l \) would have escaped. But according to van Rooij’s account for counterfactual donkey sentences, the answer is ‘no’, at least if we take the counterfactual at face value and

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6 See van Rooij (2006: 393).
7 Thanks to the anonymous reviewer who provided this example. It is much simpler than the one used in the first version of this paper, which was inspired by Kratzer (1989) and Williamson (2008), and went as follows: In the zoo, there are two tigers, \( t_1 \) and \( t_2 \), and one lion \( l \). It is discovered that the tigers’ cage is open and that \( t_1 \) escaped. \( t_2 \) is still in its cage, as is \( l \), whose cage is properly locked. Now the question is whether we should accept the statement, ‘Besides \( t_1 \), if another animal in the zoo had escaped, then it would have been a tiger.’
treat it as a normal case, in which the key equivalence holds. The sentence gets the following translation:

\[(5) \quad (\exists x (Ax \land Ex)) \leftrightarrow Tx^8\]

According to van Rooij’s equivalence, we can safely assert that (5) is equivalent with the following formula, with wide scope for the universal quantifier:

\[(6) \quad \forall x ((Ax \land Ex) \leftrightarrow Tx)\]

Thus, it is predicted that the sentence in question is false because in the course of verifying (6), we must consider assigning the lion \(l\) to the variable \(x\), but in this case the closest worlds in which the lion \(l\) escaped, that is, \(Al \land El\) holds, can never be the one where it is a tiger, that is, \(Tl\) holds, in the situation as described.

Now, of course one might claim that this is an exceptional case and that the example should be treated as a ‘weak’ counterfactual. But rather than taking recourse to such an \textit{ad hoc} manoeuvre we may wonder what has gone wrong. As far as we can see, the problem lies in the interaction of the anaphora with the selection of the closest antecedent worlds. As we explained earlier in section 1, the selection function defined by van Rooij is based on the similarity relation between world–assignment pairs rather than worlds. According to van Rooij’s definition of this kind of similarity relation, two world–assignment pairs are comparable only in case they have the same assignment, but this means that if there is one new variable introduced by the antecedent of a counterfactual, we should check for each individual in the domain separately which are the closest antecedent possibilities, and this is precisely the reason why the lion \(l\) has to be considered when evaluating the sentence in question above.

Actually, the selection function needs to be independent of the details of the assignment function and so to choose the world–assignment pairs whose worlds are the closest to the evaluation world. This gives the right interpretation for (4) because the world closest to the real world where an animal escaped is the one in which \(t\) escaped but \(l\) did not; moreover, \(t\) is indeed a tiger there. So, in section 3, we will give a new interpretation of counterfactuals in dynamic semantics where the selection function will be defined based on the comparative similarity relation between worlds, rather than world–assignment pairs, just as in the original proposals by Stalnaker and Lewis. Counterfactuals will be treated in a unified way. In the following text, I will always use

\^[8] \(A\), \(E\) and \(T\) are predicates for ‘is an animal’, ‘escape’ and ‘is a tiger’, respectively.
the phrase ‘first-order counterfactuals’ as short for ‘counterfactuals in
a language of first-order predicate logic’.

3 SOLUTION

Our theory is based on the version of dynamic semantics given in
Groenendijk et al. (1996). We will first introduce some of their basic
notions, and then we will give the update condition for first-order
counterfactuals based on these notions.

3.1 Basic notions

The language $L_0$ is standard first-order language. A model $M$ for $L_0$ is
a pair $\langle W, D \rangle$, where $W$, the set of possible worlds, is a non-empty set
of interpretation functions for the non-logical constants in $L_0$, and $D$, the
domain of discourse, is a non-empty set of individuals. Based on $M$,
the notions of possibilities and information states are defined as follows:

**Definition 1 (Possibilities and information states)** Let $M = 
\langle W, D \rangle$ be a model for $L_0$ and $V$ be the set of variables in $L_0$.

(a) The **possibilities** based on $M$ are a set $I$ of pairs $\langle w, g \rangle$, where $w \in
W$, and $g$ is an assignment function from $X (X \subseteq V)$ to $D$; $I^X = 
\{ \langle w, g \rangle \in I : \text{the domain of } g \text{ is } X, X \subseteq V \}$.

(b) The set of **information states** based on $I$ is the set $S$ such that $s \in S
\text{ iff } s \subseteq I^X$ for some $X \subseteq V$.

A possibility involves two ingredients: a possible world $w$ and an
assignment function $g$. An information state is a set of possibilities
whose assignment functions have the same domain. From the following
definition, we will see that a possibility contains enough information
for the interpretation of the basic expressions in $L_0$.

**Definition 2** Let $\alpha$ be a basic expression, $i = \langle w, g \rangle \in I$, with $X
\subseteq V$ the domain of $g$, and $I$ based upon $W$ and $D$. The **denotation** of
$\alpha$ in $i$, $i(\alpha)$, is defined as follows:

(a) If $\alpha$ is an individual constant, then $i(\alpha) = w(\alpha) \in D$.

(b) If $\alpha$ is an $n$-place predicate, then $i(\alpha) = w(\alpha) \subseteq D^n$.

(c) If $\alpha$ is a variable such that $\alpha \in X$, then $i(\alpha) = g(\alpha) \in D$, else $i(\alpha)$ is
not defined.

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We have simplified matters by leaving out the referent systems as they occur in the possibilities of
the system devised in Groenendijk et al. (1996).
So, for a non-logical constant, its denotation in $i$ is exactly what $w$ assigns to it, while for the value of a variable, it is determined by the assignment function.

The following resetting device will come in handy when we define the interpretation of existential formulae.

**Definition 3** Let $i = \langle w, g \rangle \in I^X$ for some $X \subseteq V$; $x \not\in X$; $d \in D$ and $s \subseteq I^X$.

(a) $i[x/d] = \langle w, g[x/d] \rangle$.

(b) $s[x/d] = \{i[x/d] : i \in s\}$.

An essential notion for the dynamic interpretation of a first-order language is the notion of subsistence.

**Definition 4 (Subsistence)** Let $s, s' \in S$, and $i = \langle w, g \rangle \in s$.

(a) $i$ subsists in $s'$ iff $\exists i' = \langle w, g' \rangle \in s' : w = w'$ and $g \subseteq g'$.

(b) $s$ subsists in $s'$ iff all $i \in s$ subsist in $s'$.

So, a possibility $i$ subsists in a state $s'$ iff there exists a possibility $i' \in s'$ such that $i'$ is the same as $i$ except for the possible introduction of new variables (we shall call $i'$ a descendant of $i$ in $s'$); a state $s$ subsists in a state $s'$ iff all possibilities in $s$ subsist in $s'$.

Now it is time to see the core of dynamic semantics—the update conditions for the formulae of $L_0$.

**Definition 5** Let $s \in S$ be an information state, and $\phi$ a formula of $L_0$. The update of $s$ with $\phi$ is recursively defined as follows:

(a) $s[Rt_1 \ldots t_n] = \{i \in s : \langle i(t_1), \ldots, i(t_n) \rangle \in i(R)\}$.

(b) $s[t_1 = t_2] = \{i \in s : i(t_1) = i(t_2)\}$.

(c) $s[\neg \phi] = \{i \in s : i \text{ does not subsist in } s[\phi]\}$.

(d) $s[\phi \land \psi] = s[\phi][\psi]$.

(e) $s[\exists x \phi] = \bigcup_{d \in D}(s[x/d][\phi])$.

Updating a state $s$ with an atomic formula preserves those possibilities in $s$ which satisfy the formula in a classical sense. The negation of $\phi$ eliminates those possibilities that subsist after hypothetically updating $s$ with $\phi$. Updating a state with a conjunction is done sequentially. Updating $s$ with $\exists x \phi$ proceeds by collecting all the possibilities in $s[x/d][\phi]$ for each object $d$ in the domain. Now the following facts hold:
Definition 6 (Consistency and support) Let $s$ be an information state, and $\phi$ be a formula of $L_0$.

(a) $\phi$ is consistent with $s$ iff $s[\phi]$ exists and $s[\phi] \neq \phi$.

(b) $\phi$ is supported by $s$: $s \models \phi$ iff $s[\phi]$ exists and $s$ subsists in $s[\phi]$.

A formula $\phi \in L_0$ is consistent with a state $s \in S$ if and only if updating $s$ with $\phi$ does not result in an empty set, and $\phi$ is supported by $s$ if and only if updating $s$ with $\phi$ adds no new information except for the possible introduction of new variables. Furthermore, we should mention that consistency and support now become the core concepts instead of truth and falsity because what matters in dynamic semantics is information about the world, rather than the relation between language and the world. For further discussion, see Groenendijk et al. (1996).

3.2 Dynamic interpretation of first-order counterfactuals

Now we turn to the interpretation of counterfactuals in this dynamic system. Veltman (2005) proposed to treat the meaning of a counterfactual in dynamic semantics as a test. On this view, counterfactuals do not convey new information—not directly at least. Here is a quotation from his paper:

‘By asserting ‘if had been $\phi$, would have been $\psi$’, a speaker makes a kind of commitment: ‘given the general laws and the facts I am acquainted with, the consequent $\psi$ is supported by the state I get in when I assume that the antecedent $\phi$ had been the case’. Then the addressee is supposed to determine whether the same holds on account of his or her own information. If not, a discussion will arise, and in the course of this discussion both the speaker and the hearer may learn some new laws and facts, which could affect the outcome of the test.’ Veltman (2005: 171)

According to Veltman’s proposal, the natural way to define the update condition for a counterfactual is this:

$$s[\phi \rightsquigarrow \psi] = s \text{ if } s[\phi]^c \models \psi; s[\phi \rightsquigarrow \psi] = \emptyset, \text{ otherwise.}$$
We assume that $s[\phi]^c$ in the above informal definition is the subordinate state where we get in when assuming that the antecedent $\phi$ had been the case. Then Veltman’s definition says that if $\psi$ is supported by this subordinate state, updating a state $s$ with $\phi \Rightarrow \psi$ leaves the state $s$ unchanged; otherwise, the update results in the empty set. In our theory, we will adopt this update condition for counterfactuals. Then in the following, we will explain what this subordinate state really is.

Our strategy is to apply the Stalnaker–Lewis account of counterfactuals to the dynamic framework. Our strategy is to apply the Stalnaker–Lewis account of counterfactuals to the dynamic framework.10 More precisely, we will define the state we get in when assuming that $\phi$ had been the case to be the set obtained by taking each possibility $i$ in $s$ the $\phi$-possibilities closest to $i$. To formalize this idea, we need to introduce the following auxiliary notions:

**Definition 7** Let $\phi$ be a formula of $L_0$, and $I$ a set of possibilities based on $\langle D, W \rangle$.

(a) A binary relation $<_w$ is defined on $W$, which is strictly partially ordered, strongly centered,11 almost connected12 and well founded.

(b) For $i \in I$, $i$ is a $\phi$-possibility iff $\{i\} \models \phi$.

(c) $/\phi/g = \bigcup_{i \in I'} r(i)[\phi]$ ($I' = \{i \in I: i$ is a $\phi$-possibility whose assignment is $g\}$).

(d) The selection function $f(\phi/g, \langle w, g \rangle)$ = $\{\langle w', g' \rangle \in /\phi/g: \text{for all } \langle w'', g'' \rangle \in /\phi/g, w' \leq_w w''\}$.

(e) $s[\phi]^c = \bigcup_{\langle w, g \rangle} f(\phi/g, \langle w, g \rangle)$.

Let us explain this definition. First, a comparative similarity relation with the properties listed above is defined on $W$. With these properties, we can say that $w'$ is closer to $w$ than $w''$ if $w' <_w w''$.13,14 Then, the notion of $\phi$-possibility is introduced: $i$ is a $\phi$-possibility if $\phi$ is supported by the state $\{i\}$. The set $/\phi/g$ is defined to guarantee that if $\phi$ introduces some new variables, all of them are interpreted in these possibilities, that is, when $\phi$ does not introduce new variables, all the

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10 Here we deviate from Veltman (2005), who does not start from a fixed comparative similarity relation to define $s[\phi]^c$.

11 Strong centering: $\forall w, v: w \neq v \Rightarrow w <_w v$.

12 Almost connected: $\forall u, v, w, z: u < z w \Rightarrow u < z v \lor v < z w$.

13 We define $w'$ and $w''$ are equally close to $w$: $w' =_w w''$ iff neither $w' <_w w''$ nor $w'' <_w w'$, and will write $w' \leq_w w''$ to mean that either $w' <_w w''$ or $w' =_w w''$. $w' \leq_w w''$ can be read as ‘$w'$ is at least as close to $w$ as $w''$’.

14 For the interpretation of counterfactuals, there is no agreement which properties the comparative similarity relation on $W$ should have. Here we just adopt Lewis’ (1973) proposal, which is the best known. As far as we can see, nothing really hinges on this particular choice.
elements in $\phi/g$ are $\phi$-possibilities with the same assignment $g$, but when $\phi$ does introduce new variables, the elements of $\phi/g$ are $\phi$-possibilities whose assignments only differ from $g$ in that these newly introduced variables are interpreted. Then the selection function $f(\phi/g, \langle w, g \rangle)$ is defined to pick out the possibilities in $\phi/g$ whose world is the closest to $w$. Following Stalnaker and Lewis, we call these possibilities the $\phi$-possibilities closest to $\langle w, g \rangle$. Note that the choice of the closest antecedent possibilities now only depends on the comparative similarity relation between the worlds involved; unlike in van Rooij’s definition, assignments play no role. Finally, we define the counterfactual update function. From this, we can obtain the collection for each possibility $\langle w, g \rangle$ in the state $s$ the $\phi$-possibilities closest to $\langle w, g \rangle$. And this is exactly what we want.

So now, formally, we can give the following update condition for counterfactuals in dynamic semantics:

**Definition 8 (Counterfactuals as tests)** Let $\phi$ and $\psi$ be formulae of $L_0$, $s \in S$.

$s[\phi \rightsquigarrow \psi] = s$, if $s[\phi]^c \models \psi$,

$s[\phi \rightsquigarrow \psi] = \varnothing$, otherwise.

With these technicalities out of the way, let us now see how the problems discussed above can be handled.

## 4 ILLUSTRATION

We construct the following model for the zoo scenario: $D = \{d_1, d_2\}$, $W = \{w_0, \ldots, w_3\}$, $w_k(t) = d_1$, $w_k(l) = d_2$, $w_k(A) = \{d_1, d_2\}$, $w_k(T) = \{d_1\}$ ($0 \leq k \leq 3$) and the denotations of $E$ are different in each $w_k$ (as in the table below). Obviously, $w_0$ is the real world. Then, it is reasonable for us to define the following binary relation $<_{w_0}$ on $W$: $w_0 <_{w_0} w_2 <_{w_0} w_1 <_{w_0} w_3$. Suppose that the real information state $s$ is $\{\langle w_0, g \rangle\}$ and that the domain of $g$ is empty.

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The formula under evaluation is as follows:

\[(\exists x (Ax \land Ex)) \overset{\sim}{\rightarrow} Tx\]

What we are going to check is whether (5) is supported by the information state \(s\). According to our theory, first, we need to work out all the possibilities in \(\exists x (Ax \land Ex)/g\):

\[
\exists x (Ax \land Ex)/g = \{\langle w_1, g[x/d_2]\rangle, \langle w_2, g[x/d_1]\rangle, \langle w_3, g[x/d_1]\rangle, \langle w_3, g[x/d_2]\rangle\}.
\]

All these possibilities are antecedent possibilities whose assignments are the same as \(g\) except that the variable \(x\) is interpreted. Now the selection function can do its job. According to our definition, the possibility we have to pick out is \(\langle w_2, g[x/d_1]\rangle\) because this possibility is the one whose world is the closest to \(w_0\) among the possibilities in \(\exists x (Ax \land Ex)/g\). Since the denotation of \(x\) is \(d_1\), and \(d_1\) is a tiger, we can conclude that (5) is supported by the information state \(s\), which means that the counterfactual in question is acceptable according to our theory. This is the right result.

Turning to identification counterfactual donkey sentences like (2), since van Rooij has already showed that there is no problem if the set of unselective binding variables is empty (the comparative similarity relation between world-assignment pairs reduces to the one between worlds in this case), (2) is explained by our analysis as well, for the comparative similarity relation defined in our theory is always between worlds. For the same reason, it is also easy to see that weak counterfactual donkey sentences like (3) are handled correctly, too.

To conclude, we have argued that a counterfactual donkey formula like \((\exists x Px) \overset{\sim}{\rightarrow} Qx\) should not be equivalent to \(\forall x (Px \overset{\sim}{\rightarrow} Qx)\) and offered a semantics in which they are not. What is expressed by a dynamic formula of the form \((\exists x Px) \overset{\sim}{\rightarrow} Qx\) cannot be expressed by any static formula, or so it seems. Our dynamic interpretation can be used as a unified way to account for first-order counterfactuals, especially the donkey ones.15

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15 van Rooij (2006) deals with two more issues in conditional logic: one is the intuitive plausibility of SDA \(((\phi \lor \psi) \rightarrow \gamma) \rightarrow ((\phi \rightarrow \gamma) \land (\psi \rightarrow \gamma))\), and the other is the appropriateness of the negative polarity item \(\text{any}\) in the antecedents of counterfactuals. [See details in section 3.2 of van Rooij (2006).] van Rooij claimed that these two problems can be solved in his framework. But as far as we can see, both of his solutions on these two problems rely on the general equivalence between \((\exists x Px) \overset{\sim}{\rightarrow} Qx\) and \(\forall x (Px \overset{\sim}{\rightarrow} Qx)\). Without this equivalence, his proposal cannot stand. We will propose different solutions to these two problems in a forthcoming paper on counterfactuals in dynamic context.
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