5.7. Translation Variations: Existential Sentences

1. Single-Predicate Sentences. Already in our earliest quantifier examples we saw how to translate English "something" and "nothing" sentences employing a single predicate.

G: ____ is a material object.

Something in the universe is a material object.

∃x Gx

Nothing in the universe is a material object.

~∃x Gx

Note that both these English quantifier phrases incorporate the word "**thing**" – not as a further predicate ("is a thing," besides "is a material object"), but as part of an empty linguistic 'pincushion' to which predicates attach. An equally featureless English variation on "thing" is "**object**". So instead of "something" we can say "**some object**"; and likewise for "**no object**".

And because "thing" and "object" are so uninformative, we can leave off mention of "objects" (or "objects in the universe") later, citing just the predicate: "Everything is material," "Some things are material," and "Nothing is material".[1]

[1] That said, we see that the predicate at work in our earlier sentences was really just "is material" – not "is a material object". For even there "object" served only as an empty 'coat hook' on which to hang the predicate, for purposes of English quantification. Of course placing "object" or "thing" in a predicate phrase does no harm – if only because, meaning-wise, the word makes no difference.

English also appeals to **existential "there,"** used not to refer to a spatial location (as it would in "The car is over there"), but simply to cite existence.

> Some things are material objects.
> **There are material objects**.

A variant on this places the predicate inside a relative clause.

> There are objects [which are **material**]
> There are objects [which **travel faster than light**]

And since **negative existential** claims such as "Nothing is a material object" serve to deny an existential, existential "there" appears in these constructions as well.

> Nothing travels faster than light.
> **There are no objects [which travel faster than light]**

Notice that in these sorts of sentences "**exist**" acts as a variant of the verb "be".

> There are material objects.
> There **exist** material objects.

> There **are no** unicorns
> There **exist no** unicorns.
> **No** unicorns **exist**.
> Unicorns do**n't exist**.

Within the context of a larger negation, "any" also expresses an existential claim.[2]

> Nothing is a unicorn.
> There are**n't any** unicorns.
> There is**n't any** object which is a unicorn.

[2] Other contexts where "any" acts as an existential phrase include the antecedent of a conditional ("If any customers show up, I'll be surprised") and questions ("Are there any questions?"). See (Larson 1995: XX) for further discussion.

2. Existential Sentences with Two Predicates. We've looked already at existential sentences with two different predicates – as in the following example.[3]

Something both is a cat and isn't a cat.

G: ___ is a cat

∃x (Gx ∧ ~Gx)

But less absurd sentences likewise attribute two different features to an object.

Some cats are black.

G: ___ is a cat **H**: ___ is black

∃x (Gx ∧ Hx)

As support for this translation, recall that 'stacked-up' predicates such as "Greek philosopher" or "green frog" were likewise treated as conjunctions. So "*x* is a black cat" translates as "(Gx ∧ Hx)"; and the existential "**∃x** (Gx ∧ Hx)" says "There are black cats," or "Black cats exists".

But both those sentences stake the same claim as the original existential "Some cats are black".

Some cats are black.
There are black cats.
Black cats exist.

Whenever one of these sentences is true, the other two will be as well.

[3] In "5.4. Construction Revisited: Quantifiers, Variables, Binding".

Existential Sentences and Pragmatics

While we've noted the tradition in Logic of interpreting "some" to mean "at least one," that tradition can look suspect; for it seems in ordinary language we often **don't** mean "at least some" when we say "some". For example: if I say "Some of the students passed the class" when I know that in fact all of them passed, my claim seems misleading or deceptive. And that appearance of deception would be explained immediately if we assumed that "some" means "only some" – for in a case where all the students passed, it would be simply **false** to claim that only some of them did.

But the traditional reading of "some" can be defended even in the face of that last observation, if we recall a point from our earlier discussion of pragmatics: that we can deceive in language not simply by uttering a false sentence, but by deliberately saying less than we know. So if you ask where the remote control is, and I tell you it's "somewhere in the kitchen" even though I know exactly where (in the kitchen) it is, I've misled you without saying anything false. In particular, I've violated Grice's **Maxim of Quantity**: "Make your contribution to the conversation as informative as necessary."

Likewise with existentials: if you ask how many students passed the exam, and I say "some students did" though I know that all of them did, I'm deliberately, and deceptively, withholding relevant information. Since pragmatics here explains this appearance of deception, we don't after all need to assume that "some" means "only some".

And recalling from Chapter Three that the order of parts in a conjunction doesn't affect truth or falsehood, our formal translation provides an easy explanation for why all the following sentences make the same claim.

Some doctors are men
Some men are doctors.

But caution is needed when adding a tilde to the mix – for different combinations of negation and quantification are possible. For example, we had better not confuse the following two sentences, as they clearly make different claims.

Some non-carnivores are cats	**∃x (~Gx ∧ Hx)**
Some carnivores are non-cats	**∃x (Gx ∧ ~Hx)**

The first sentence is **false** in the actual world (since al cats are carnivorous), but the second is **true** (lions and tigers and bears all being carnivorous). The second sentence is in fact equivalent to the following.

Some carnivores are non-cats	**∃x (Gx ∧ ~Hx)**
Some carnivores are not cats	**∃x (Gx ∧ ~Hx)**

A third combination of tildes and existentials comes in negative existential claims; for the earlier single-predicate **negative existential** sentences such as "Nothing is a unicorn" can likewise be scaled up to two predicates. A sentence such as "No cats are lizards" is the denial that even one cat is a lizard.

G: is a cat **H**: likes baths

Some cats are lizards.
∃x (Gx ∧ Hx)

No cats are lizards.
~∃x (Gx ∧ Hx)

And here again the order of parts has no effect on the truth of a conjunction: whenever it's true that "No cats are lizards," it's true that "No lizards are cats". Our formal translation explains why.

No cats are lizards.
$\sim\exists x\,(Gx \wedge Hx)$

No lizards are cats.
$\sim\exists x\,(Hx \wedge Gx)$

Finally, the phrase "**only some**" means the same as "**some but not all**," and so can be translated via a combination of existential and universal sentences (discussed in a later reading). But restricting ourselves to just existentials, note that the same claim is stated by the sentence "Some doctors are male, but some are not" – which we already know how to translate.

Only some doctors are male.
("Some doctors are male, but some doctors are not male.")

K: is a doctor **L**: is male

$(\exists x\,(Kx \wedge Lx) \wedge \exists x\,(Kx \wedge \sim Lx)$

Appeal to "**among**" offers an equivalent variation.

Only some doctors are male.
Among doctors, only some are male.

3. Existentials with Multiple Predicates. Scaling up to three or more predicates is easy with existentials: since an existential sentence uses conjunction to string together its little quasi-sentences, we can tack on as many more parts of a conjunction as we please.

K: is Greek **M**: is a philosopher
L: is male

Some Greek males are philosophers.
∃x ((Kx ∧ Lx) ∧ Mx)

Again, because neither grouping nor order of parts affects the truth of a conjunction, formal translation suggests that all of the following sentences say basically the same thing – as indeed they do.

Some Greeks are male philosophers.
∃x (Kx ∧ (Lx ∧ Mx))

Some Greek philosophers are male.
∃x ((Kx ∧ Mx) ∧ Lx)

Some philosophers are Greek males.
∃x (Mx ∧ (Kx ∧ Lx))

Some male philosophers are Greek.
∃x ((Lx ∧ Mx) ∧ Kx)

Existential Translation Variations
Summary Sheet

Something is G
There are G
There exist G
} **$\exists x\, Gx$**

Nothing is G
There are no G
There aren't any Gs
} **$\sim\exists x\, Gx$**

Some G are H
There are GH
GHs exist
} **$\exists x\, (Gx \wedge Hx)$**

Some non-G are H } **$\exists x\, (\sim Gx \wedge Hx)$**

Some G are non-H
Some G are not H
} **$\exists x\, (Gx \wedge \sim Hx)$**

No G are H
There are no GH
} **$\sim\exists x\, (Gx \wedge Hx)$**

Only some G are H
Among G, only some are H
} **$(\exists x\, (Gx \wedge Hx) \wedge \exists x\, (Gx \wedge \sim Hx))$**

Some G are HI
Some GH are I
} **$\exists x\, ((Gx \wedge Hx) \wedge Ix)$**