

## Twister Puzzle

**S: There is a can opener that can open any can that any can opener that can open any can can open.**

**Ga: a is a can opener**

**Fa: a is a can**

**Hab: a can open b**

Define

Ry: y is a can that any can opener that can open any can can open.

Then

$S : \forall x[Gx \wedge \wedge y(Ry \rightarrow Hxy)]$

Now,

Ry:  $Fy \wedge \wedge w[Gw \wedge \wedge z(Fz \rightarrow Hwz) \rightarrow Hwy]$ .                      So we get

$S : \forall x[Gx \wedge \wedge y(Fy \wedge \wedge w[Gw \wedge \wedge z(Fz \rightarrow Hwz) \rightarrow Hwy] \rightarrow Hxy)]$

This understands “can opener that can open any can” to mean a can opener that can open any can at all (i.e. every can)

However “can opener that can open any can” might mean a can opener that can open some can (or other). Then we’d replace Ry by Qy where

Qy:  $Fy \wedge \wedge w[Gw \wedge \forall z(Fz \wedge Hwz) \rightarrow Hwy]$ .                      Then we’d get

$S : \forall x[Gx \wedge \wedge y(Fy \wedge \wedge w[Gw \wedge \forall z(Fz \wedge Hwz) \rightarrow Hwy] \rightarrow Hxy)]$