











$$(8) \quad QG = Q'[Subj], QG \xrightarrow{\text{OperationalizeAs}} QC, T \xrightarrow{\text{break}} QC: S(T) \Rightarrow D(QC); S(Subj) \wedge D(QC) \Rightarrow D(QG)$$

The axioms (6 ~ 8) deal with the satisfaction of quality goals at the bottom of the quality goal hierarchy. A quality goal  $QG$  will be satisfied, if the actual quality value of each individual in  $Subj$  on quality type  $QT$  belongs to the region  $RG$  being specified by a quality constraint  $QC$  (axiom 6). Axiom (7 ~ 8) show the semantics of make and break: if a task  $T$  makes (resp. breaks) a quality constraint  $QC$ , then the corresponding quality goal  $QG$  of  $QC$  will also be satisfied (resp. denied). It is worth mentioning that to deny  $QG$ , we also need its subject  $Subj$  to be achieved; otherwise the satisfaction of  $QG$  is unknown.

## 5 Conclusions and Future work

In this paper, we identified from NFRs quality requirements and model them as quality goals. Accordingly, we proposed a revisited goal modeling framework, sketching an abstract syntax and semantics. There are several interesting and challenging problems open for discussion: How to properly and systematically handle ambiguous qualities (e.g. inexpensive and low cost)? How will tasks influence the quality values of the concerned qualities? How to incorporate context in our goal models? These will be the key concerns in our next steps.

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