# Towards an Understanding of Shared Understanding in Military Coalition Contexts

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## Varieties of Understanding

### Sensations

- Perception involves more than just an ability to detect stimuli; it also depends on an ability to make sense of stimuli.
- To perceive one must have sensory impressions that one understands.
- Understanding is a kind of predictive ability – an ability to appreciate the sensory consequences of movement or change.

### Actions

- We understand a person's actions when we are able to explain or account for them.
- We explain actions by reference to a person's mental states.
- Understanding is manifest as an ability to explain or predict a person's actions in particular situations.

### Language

- We understand linguistic expressions when we are able to use those expressions correctly.
- To understand a sentence is to be able to do things that involve the sentence, e.g. to apply it correctly, to paraphrase it and to respond to it in appropriate ways.
- Understanding is akin to 'flexible performance capability'.

### Situations

- Situational understanding involves an ability to explain the current situation and predict how it will unfold in the future.
- Situational understanding seems to be based on the possession of certain predictive and explanatory abilities, abilities that seem to be based on a knowledge certain (causal) relationships.
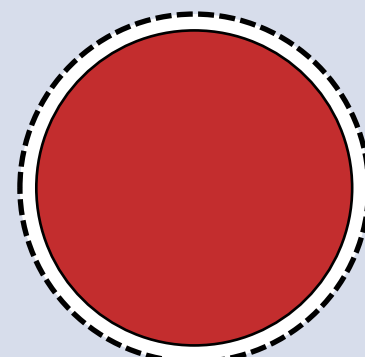
## Understanding

- The notion of understanding is similar to the notion of an ability.
- Typically, understanding is evidenced by our descriptive, explanatory and predictive successes regarding the object of understanding.

## Mental Models

- Mental models support the expression of particular abilities, such as those related to description, explanation and prediction.
- Mental models provide a mechanistic realization of performances that warrant the ascription of understanding to an agent.
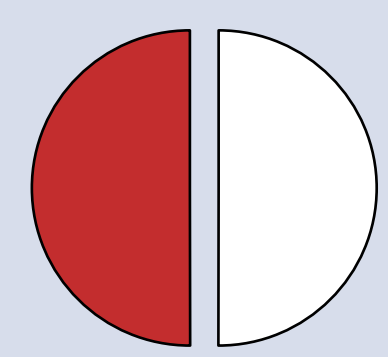
## Shared Understanding

- Shared understanding is an ability (or something similar to an ability) that is common to multiple agents.
- Shared understanding does not entail similarity of response output (i.e. the specific behaviours manifesting understanding may differ across agents).
- Shared understanding is commonly seen as enabling the expression of compatible or complementary behaviours – it supports 'unity of effort' with respect to mission objectives.
- There may be different forms of understanding: 'identical understanding', 'similar understanding' and 'complementary understanding'.
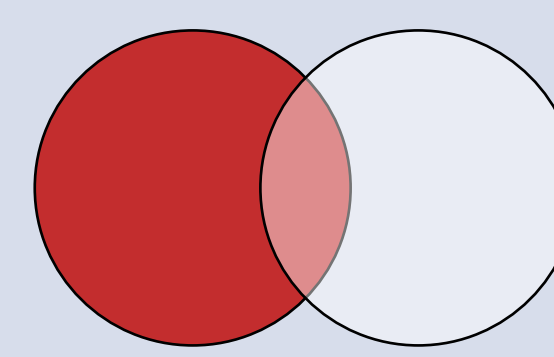


Identical Understanding        Similar Understanding        Complementary Understanding

## Situation Awareness

- SA is typically defined as "the perception of the elements in the environment within a volume of space and time, the comprehension of their meaning and the projection of their status in the near future".
- The notion of understanding therefore seems to entail a particular kind of understanding.
- We suggest SA is best conceived of as a specific form of understanding, namely 'dynamic situation understanding'.
- This resolves many points of confusion surrounding the SA concept. For example, SA is neither nor a state nor a process because understanding is neither state nor a process.

## Coalition Operations

- Shared understanding improves coalition performance – it enables coalition elements to predict and anticipate one another's behaviours and information requirements.
- Shared understanding promotes the efficient use of limited communication resources – it promotes efficient modes of inter-agent communication and coordination.
- Shared understanding may be important for factors such as group cohesion, group solidarity and trust. An ability to anticipate the information needs of teammates and behave in a way that accords with the expectations of others could be a key ingredient of what it means for someone to be regarded as a 'team player'.

## Future Work

- Understand what things need to be the objects of shared understanding in coalition operational contexts, e.g. goals, tasks and situations.
- Propose assessment methods for shared understanding.
- Assess whether the notion of understanding applies to synthetic agents – is it appropriate to talk of 'machine understanding'?
- Identify the factors that contribute to or undermine shared understanding in coalition contexts.