

Why dynamic features?

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What are dynamic features?

- Characterized by motion or change
- Occur over time
- Cannot be seen in a snapshot of a sign
- Examples: repetition, pathshape, direction
 - This presentation considers only repetition and pathshape

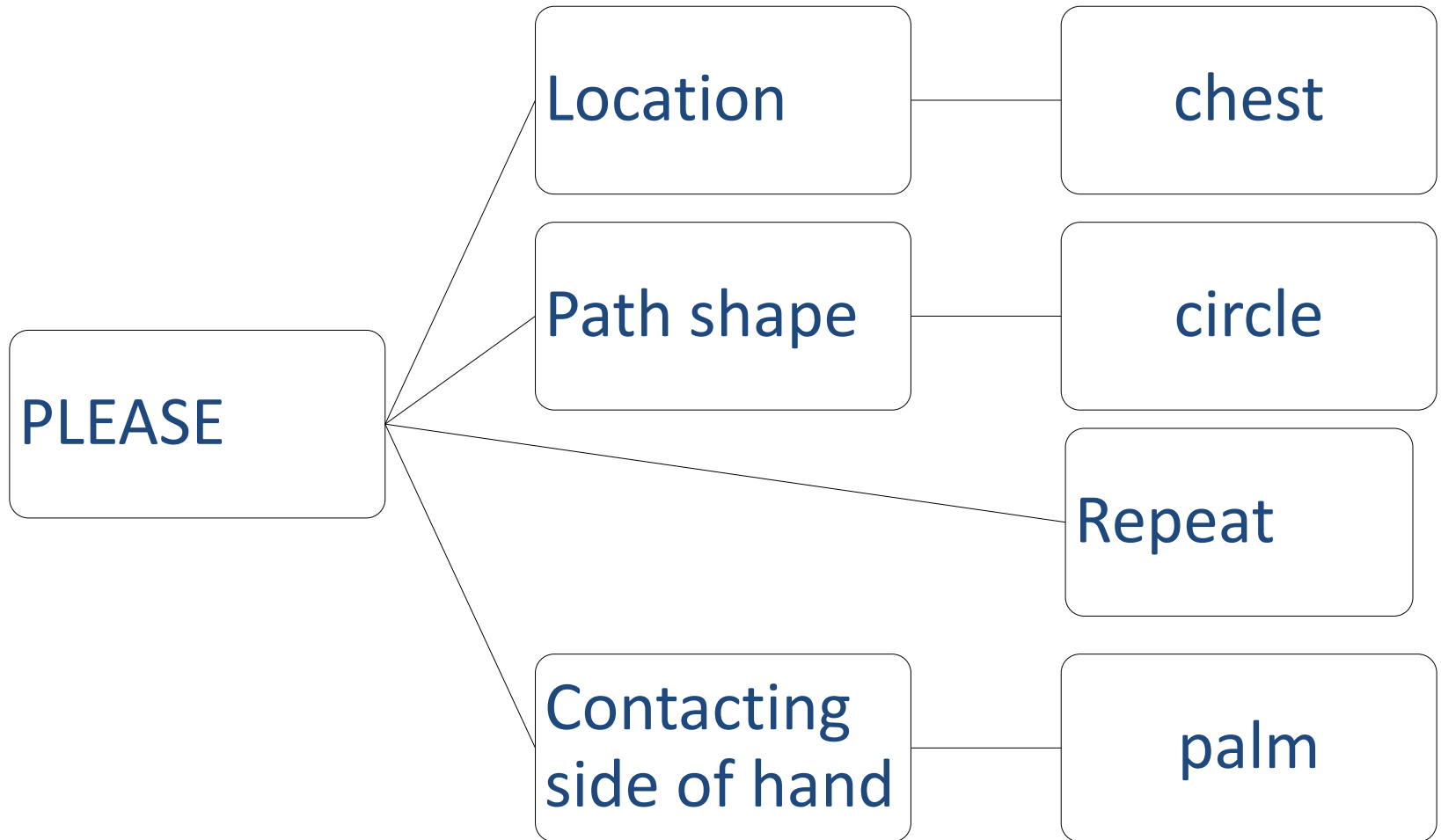
A dynamic model

- Allows pathshape, repetition, direction and other dynamic features

ASL PLEASE in a dynamic model



Partial dynamic representation of PLEASE



Dynamic model advantage

- To represent the location, path shape, and contacting part for PLEASE requires only 4 features and one segment

Dynamic features imply single segment representation

- A multiple segment representation with dynamic features will have to attach dynamic features to one segment arbitrarily or claim suprasegmental status for and underlying spreading of such features.
- Because dynamic features greatly reduce the number of locations and handshapes, the need for multiple segments is also reduced (we claim it is eliminated)

Should we use dynamic features?

- Could be replaced by more “basic” features, usually additional locations
- Not primitive mathematical concepts
- Not used in spoken language phonology

Nondynamic model

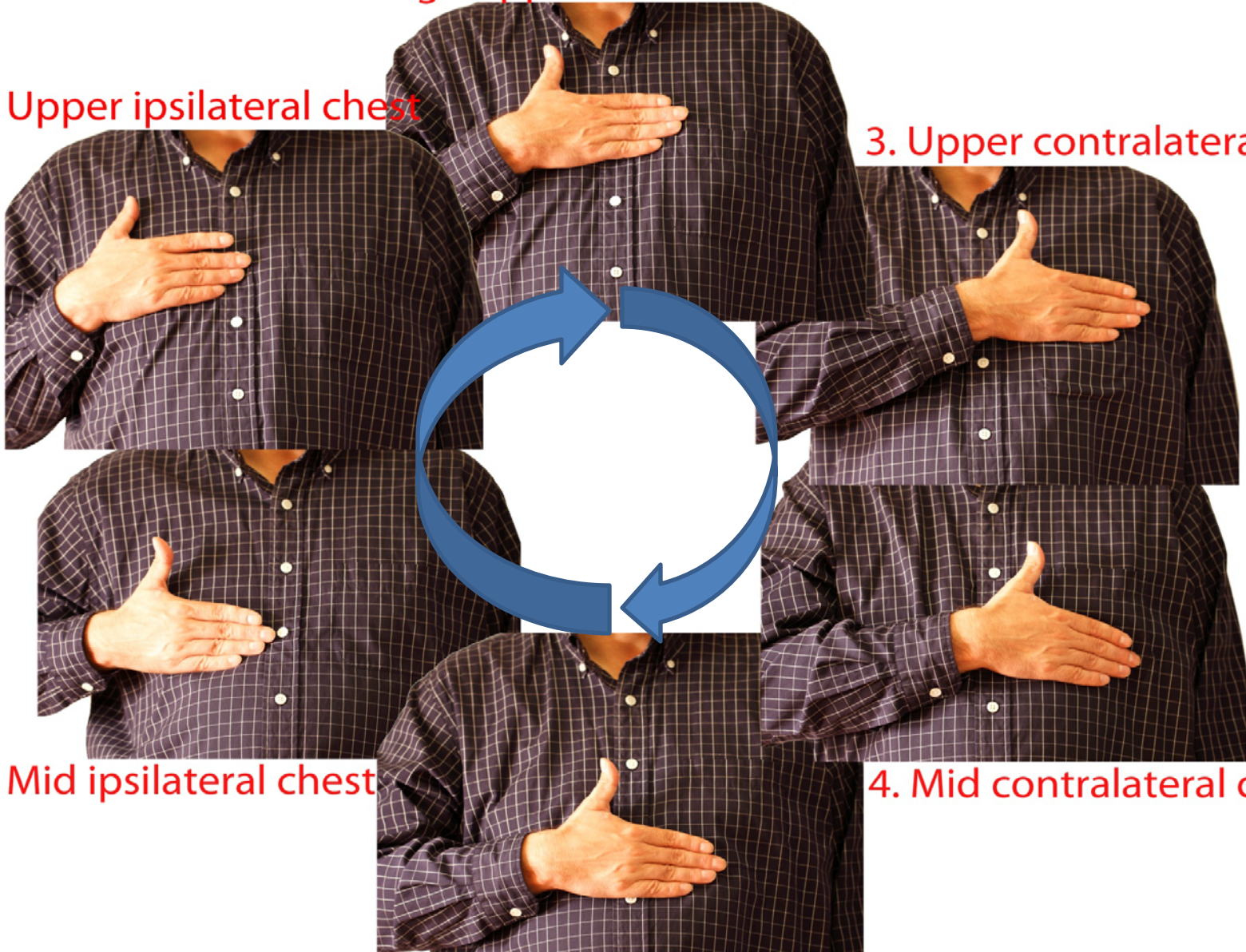
- No dynamic features allowed.
- Replace pathshape with additional locations and interpolation rule
- Replace repetition feature with repeated segments

ASL PLEASE in a non-dynamic model

2. High upper center chest

1. Upper ipsilateral chest

3. Upper contralateral chest

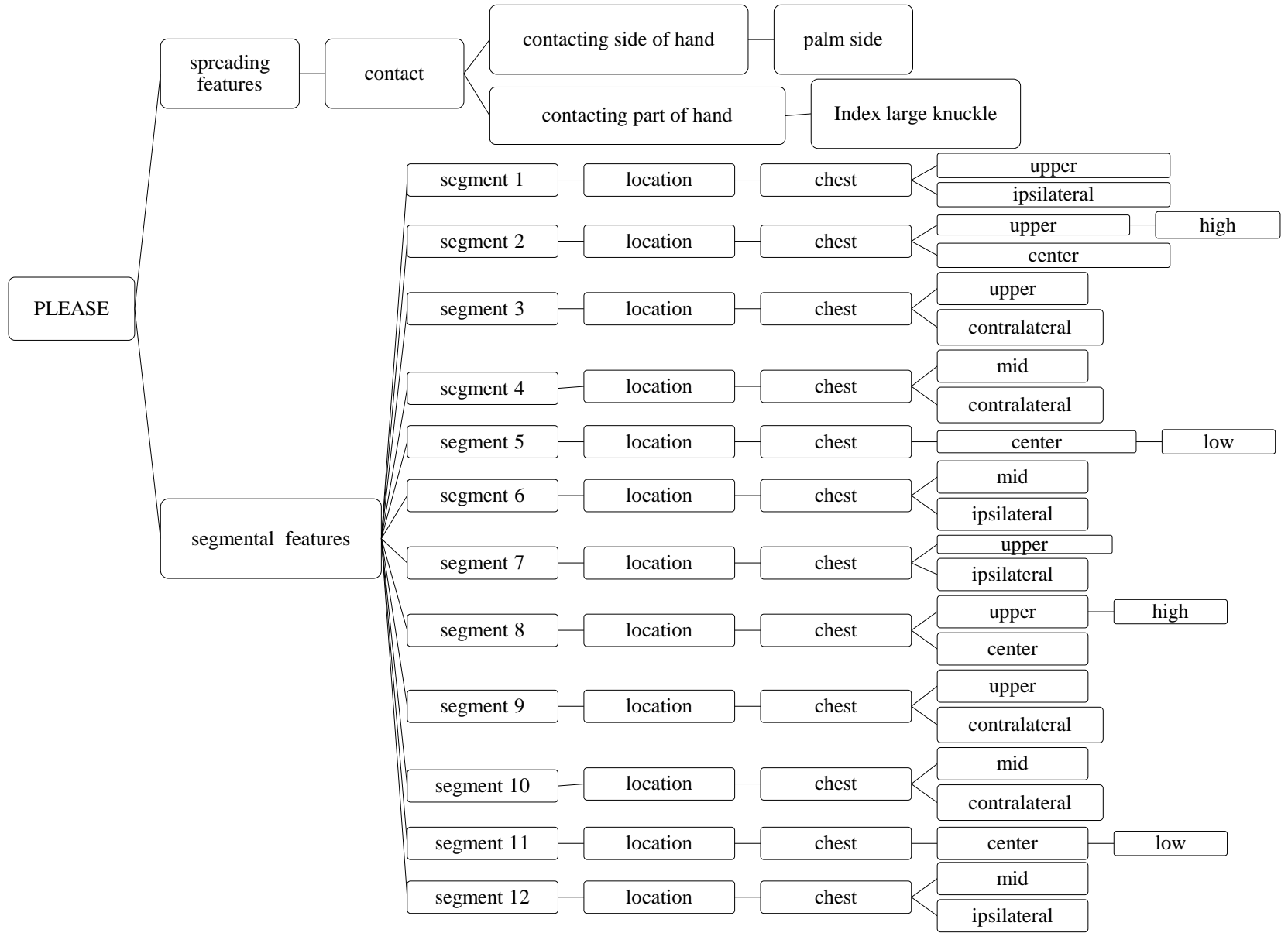


6. Mid ipsilateral chest

4. Mid contralateral chest

5. Low central chest

Partial non dynamic representation of an utterance of PLEASE with one repetition of path



Problem 1. Magical path shape rule

- The nondynamic model needs to specify enough locations to allow an interpolation process to decide if the path is straight, angular, arced, square, circular, or other.
- Possible rule to decide the pathshape:
 - If there are only two locations, or only the first two locations are distinct, then the path is straight.
 - If there are only three locations or only the first three locations are distinct, then the path is triangular.
 - If there are only four locations or only the first four locations are distinct, then the path is an arc.
 - If there are only five locations or only the first five locations are distinct, then the path is rectangular.
 - If there are only six locations or only the first six locations are distinct, then the path is circular.
- This rule is complex and arbitrary - a magical rule with no physical/phonetic basis.

Problem 2. A nondynamic model uses many more features than the dynamic model

Number of features required to represent locations, path and contacting parts

# of path repetitions	Dynamic model	Nondynamic model
2	4	40
3	4	59
4	4	78
	No change in number of features is required for varying numbers of repetitions because the model uses a repeat feature	This model increases number of features depending on the number of repetitions because it does not use a repeat feature

Problem 3. Level of detail requires discriminating between very similar locations

- For example, signer must discriminate both receptively and expressively between upper ipsilateral chest and mid ipsilateral chest.
- In order to determine the locations on the chest, the signer must also decide exactly which part of the hand to use as the contacting part, since the hand as a whole is so large that it will overlap different areas.

Problem 4. Features are too arbitrary

- The strong hand parts and locations are selected arbitrarily.
- There is no pause or special contact action at the six selected locations. How can a child decide which locations are to be included in the representation?

Problem 5. Indeterminate number of representations for one sign

- The nondynamic model has to repeat the six locations exactly as often as they are repeated, since it cannot use a dynamic [repeat] feature, so different numbers of repetitions in different utterances generate different representations.
- No phonological theory generates representations based on utterances! We assume that both signers and speakers generalize across utterances to determine which characteristics are significant and must be remembered.

Problem 6. Structural problems

- Features which do not change when the hand moves to a new location must either be repeated for each segment or moved to a suprasegmental position and some sort of spreading rule must be invoked.
 - Examples: PANCAKE has a change of contacting part from back of hand to palm of hand
 - WHITE begins with contact and ends without contact
- Examples like these can be found for almost any feature of a sign, which means that it is difficult to make any feature suprasegmental. The only alternative is to repeat these features for each segment, even when they do not change.

Conclusion

- Dynamic features are required in sign languages
- This is different from current spoken language models which do not use dynamic features
- Dynamic features are most easily and naturally accommodated in a single segment model

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