Telling Apart Task Order Actions, Subtask Order Actions And Subsubtask Actions

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There Have Been Three Major Models Of Stage Transition

- The oldest derives from Piaget's dialectical model of stage transition
  - The has been updated by Commons and Richards, Ross, and Commons and Ross
    - It consist of at least the follow steps depending on the version
      - Failure with the present stage action
      - Negation or complementation of present stage action
      - Alternation of present and complmentary action
      - Smash together of alternation and complementary action
- The next oldest is due to Dawson
  - It is the Rasch score values intermediate between stages
- The newest is the systematization arising from micro genetic research
  - It is this form that will be discussed here
  - It describes
    - Order tasks, Subtasks and Subsub tasks

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- A. Telling an order task action from subtask actions and subsubtask actions within that order
  - Stage tasks coordinate two or more actions from the previous order, not just a single prerequisite action
  - The subtasks are just prerequisites for the following action.
- B. Telling apart subtasks from subsubtasks items
  - Subsubtasks may not be prerequisites
  - They may be sufficient but not necessary precursor
- Examples on the development and evolution of counting follow in animals and humans follows

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- In addition to order of hierarchical complexity tasks, there may be other tasks within an order:
- *Prerequisites*: One action has to be acquired before a second action is possible
  - These are tasks at a number of orders of hierarchical complexity
  - Subtasks between orders of hierarchical complexity
    - Subsubtasks between the subtasks
- *Precursors*: An action comes before another action but is not necessary for the second one

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- At every order there are a number of possible subtasks and subsubtasks
  - The number of these may vary with stage and content
- Each new order requires the coordination of two or more subtask actions from the next lower order
  - We not have example where there have to be three or more such actions
- Here we are going to illustrate order task actions; suborder task actions; and subsuborder task actions

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Subtasks at Preoperational Order

- Animals having the relevant available symbol systems can learn true counting
  - These behaviors eventually begin to be applied to "any number" of objects
  - This does not happen all at once
    - There **are** subtasks that must be acquired
      - 1. One of these subtasks is learning the "tens" labels
        - Since this must be learned before counting of larger numbers may take place, it is a prerequisite
        - At first, one can count, but one does not stop
      - 2. Learning to stop is a final subtask

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Order 7: Primary

- At the Primary Order, two or more actions from the Preoperational Order are coordinated
  - As a result, the first subsubtask is to count disordered objects that are the same
  - The next subsubtask is to count disordered objects that are not the same
    - The last count indicates the size of the set
    - e.g. for five objects, that would be "5"
- This first subtask of true counting is made possible by
  - Having a way of marking that an object has already been counted
    - Such as moving it into a separate pile

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Order 7: Primary Addition

- The next subtask use of accurate counts is addition/subtraction
  - This is true adding because they are using symbolic markers to insure that they have counted an item
  - This can as easily and accurately be done with numbers greater than 10
  - Note that addition is the second subtask and only operates on one action, counting

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Third Subtask at Primary Order is Multiplication

- The subsubsteps are:
  - Substep 1 adding the same number multiple times
    - 3 * 2 = 2 + 2 + 2
- For the other subsubsteps, see Jon Boom's talk

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- One of the main uses of subtask actions and subsubtask actions is they allow sequenced theories to map into the model of hierarchical complexity
  - The most important one is Jaques
  - Take from the Jaques discussion the line up

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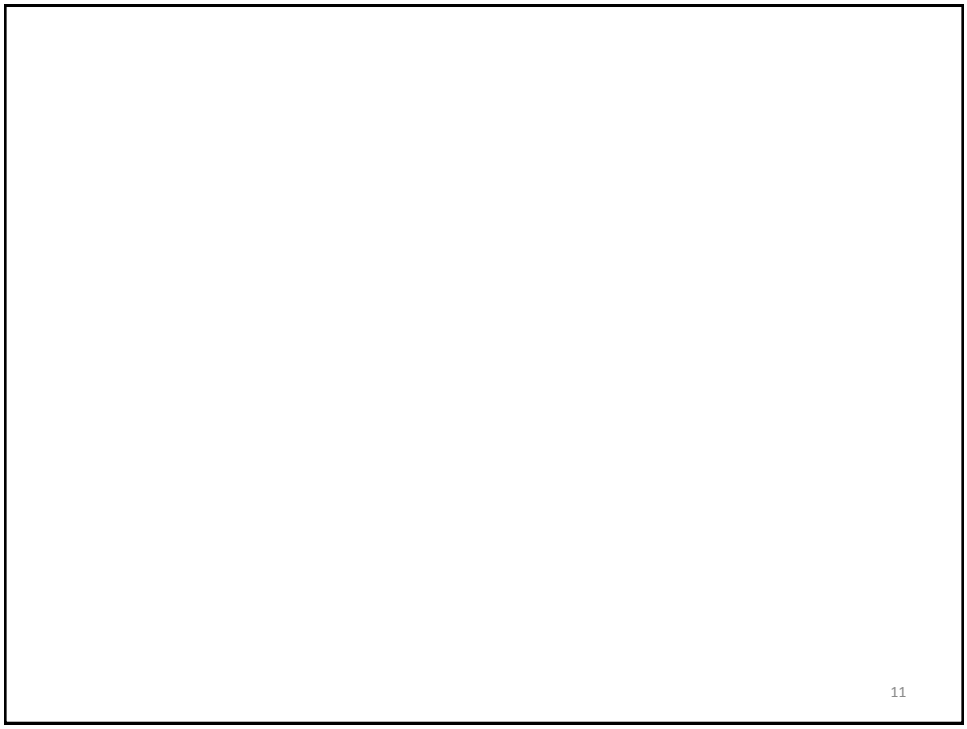
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