

# Little-c versus Big-C Creativity:

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Toward a Scientific Definition

# The Problem:

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- ❑ Can creativity research be truly scientific if researchers have reached no consensus on what creativity entails?
  - ❑ In particular, what exactly is a “creative idea”?
  - ❑ Can we really conduct scientific research on the creative process, person, or product without knowing what constitutes a creative idea?
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# Past Reviews and Discussions

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- Plucker, Beghetto, & Dow (2004)
  - Runco & Jaeger (in press)
  - Simonton (2012)
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# Four critical questions:

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- What are the assessment criteria?
  - How are the assessments scaled?
  - How are the assessments integrated?
  - Who makes the assessments?
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# What are the assessment criteria?

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- Two-criterion definitions
    - Some variation on
      - novel or original, and
      - useful, adaptive, or functional
  - But I would argue that “novelty” conflates “originality” with “surprise”
  - If we split the concept into two, then we get a three-criterion definition
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# What are the assessment criteria?

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## Three-criterion definitions

### ■ US Patent Office:

- new, useful, and nonobvious

### ■ Boden (2004):

- novel, valuable, and surprising

### ■ Amabile (1996):

- novel
  - appropriate, useful, correct, or valuable
  - heuristic rather than algorithmic
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# How are the assessments scaled?

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- Qualitative? Yes/No?
  - Quantitative? Numbers?
    - Ordinal? Ranks?
    - Interval? Continuous?
    - Ratio? Zero point?
    - Proportion or probability? 0-1?
      - My preference for latter
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# How are the assessments integrated?

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Additive?

Multiplicative?

■ Why the latter > former

The reinvented wheel?

The bank safe made out of soap bubbles?

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# Who makes the assessments?

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- The individual creator?
    - “little-c creativity”
    - “P-creative” (Boden, 2004)
  - The field?
    - “Big-Creativity”
    - “H-creative” (Boden, 2004)
  - The extra-field audience?
    - more of the latter later ...
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# Individual-level definition

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- Given  $k$  ideas  $x_1, x_2, x_3, \dots, x_i, \dots, x_k$ , how do we gauge their creativity?
  - Three parameters:
    - *personal probability*  $p_i$ 
      - where  $0 \leq p_i \leq 1$
    - *personal utility*  $u_i$ 
      - where  $0 \leq u_i \leq 1$
    - *personal obviousness*  $v_i$ 
      - where  $0 \leq v_i \leq 1$
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# Individual-level definition

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- N.B.:  $p_i = 0$  only when idea  $x_i$  is not initially available to the individual without entering an “incubation period”
  - Some priming stimulus then initiates the “spreading activation” that eventually yields  $p_i > 0$
  - Hence, a eureka or aha! experience
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# Individual-level definition

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- Derived parameters
    - *personal originality*  $(1 - p_i)$ ,
      - where  $0 \leq (1 - p_i) \leq 1$
    - *personal surprisingness*  $(1 - v_i)$ ,
      - where  $0 \leq (1 - v_i) \leq 1$
  - Therefore, *personal creativity*
    - $c_i = (1 - p_i)u_i(1 - v_i)$ ,
      - where  $0 \leq c_i \leq 1$
    - literally “little-c” creativity
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# Field-level definition

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- Csikszentmihályi's (1990) systems perspective
    - Domain "the parameters of the cultural symbol system" (p. 190)
    - Field "individuals who know the domain's grammar of rules and are more or less loosely organized to act as gatekeepers to it" (p. 201)
      - Field size =  $n$  (including the individual),
        - where  $250 \leq n \leq 600$  (Wray, 2010)
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# Field-level definition

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- If  $M_j$  identifies the  $j$ th field member:
    - $P_i = 1/n \sum p_{ji}$ , = *consensual probability*
    - $U_i = 1/n \sum u_{ji}$ , = *consensual utility*
    - $V_i = 1/n \sum v_{ji}$ , = *consensual obviousness*;  
and
    - $C_i = 1/n \sum c_{ji}$ , = *consensual creativity*,
      - or literally its “Big-C” creativity
  - where all values are positive decimals ranging from 0 to 1
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# Field-level definition

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- Yet given that the consensual parameters are averages:
    - $\sigma^2(p_i) = 1/n \sum (p_{ji} - P_i)^2,$
    - $\sigma^2(u_i) = 1/n \sum (u_{ji} - U_i)^2,$
    - $\sigma^2(v_i) = 1/n \sum (v_{ji} - V_i)^2,$  and
    - $\sigma^2(c_i) = 1/n \sum (c_{ji} - C_i)^2$
    - where all variances range from 0 to 1
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# Field-level definition

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- Hence, crucial distinction between
    - High-consensus fields where
      - $\sigma^2(p_i) \approx \sigma^2(u_i) \approx \sigma^2(v_i) \approx \sigma^2(c_i) \approx 0$ , and
    - Low-consensus fields where
      - $\sigma^2(p_i) \approx \sigma^2(u_i) \approx \sigma^2(v_i) \approx \sigma^2(c_i) \approx 1$
  - These variances are absolutely critical in calibrating the relation between little-c and Big-C creativity!
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# Individual-field creativity comparisons

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- Assume idea  $x_i$  was created by individual  $M_1$
  - Hence, the contrast is between  $c_{1i}$  and  $C_i$
  - Although the latter includes the former, any part-whole bias shrinks as  $n$  increases or as  $\sigma^2(c_i)$  decreases
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# Individual-field creativity comparisons

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- Creativity evaluations in high- versus low-consensus fields
    - High-consensus fields
      - $P_i \approx p_{1i}$ ,  $U_i \approx u_{1i}$ ,  $V_i \approx v_{1i}$ , and  $C_i \approx c_{1i}$
      - cf. “neglected genius”
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# Individual-field creativity comparisons

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- Creativity evaluations in high- versus low-consensus fields
    - Low-consensus fields
      - *Case 1:  $C_i > c_{1i}$*
      - *Case 2:  $C_i < c_{1i}$*
      - *Case 3:  $C_i \approx c_{1i}$* 
        - Individual  $M_1$  “typical” of field
        - $C_i \approx c_{1i}$  does *not* imply that  $P_i \approx p_{1i}$ ,  $U_i \approx u_{1i}$ , and  $V_i \approx v_{1i}$  except when  $C_i \approx c_{1i} \approx 1$
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# Individual-field creativity comparisons

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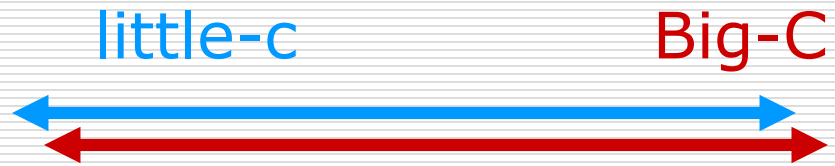
- Personal versus consensual creativity measurement in low-consensus fields
    - As  $\sigma^2(c_i) \rightarrow 1$ , then a large proportion of the field would arrive at the value  $c_{ji} = 0$  ( $j \neq 1$ )
    - Moreover, increased difficulty of calibrating the transition from “little-c” to “Big-C” creativity
    - e.g., the CAQ
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# Implications

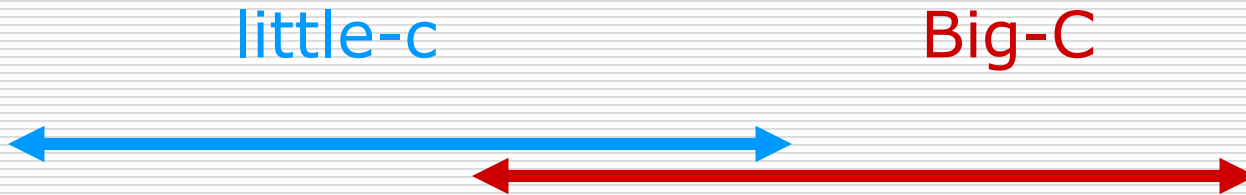
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- Big-C creativity is not just a simple extension of little-c creativity, but represents a distinct set of field assessments that may or may not dovetail with those operating at the individual level
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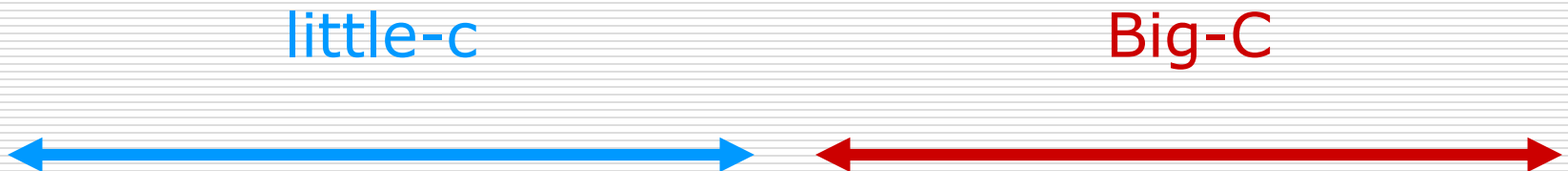
## Extremely High Consensus



## Moderate Consensus



## Extremely Low Consensus



# Future directions

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- How do we rigorously define the creative process, person, and product in terms of the creative idea?
  - How do we allow for evaluative changes across time for both personal and consensual assessments?
  - How do we incorporate extra-field evaluations of creative ideas?
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# Bottom line

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- Only when creativity researchers precisely and comprehensively defines the creative idea will creativity research become an integral part of psychological science!
  - Does everybody here agree?
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