

Insights into the creativity process

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General development of creativity

So far we have examined various aspects and characteristics of creativity and creative thinking. In this section we examine how these aspects and features may gradually emerge.

The gradual development of creativity has been neglected

The emergence of creativity and creative thinking across the span of child development has, to some extent, been neglected. This can be attributed to several causes:

- the focus on intelligence.
- the dominance of theories of child development, for example, Piaget's theory of epistemological development, that had difficulty explaining how knowledge that was 'new' or 'novel' could be acquired. Piaget's construct of equilibration explained how a developing child's knowledge both made sense of or assimilated new information using what was known and changed to accommodate it. Equilibration could not, however, explain human creativity (Feldman 1989). Constructivist epistemologies generally have difficulty explaining how ideas that did not exist previously are constructed or created (Piaget, 1971; Piaget & Voyat, 1979).

Piaget later saw creative thinking occurring through "reflective abstraction" (Piaget, 1981, p. 225) through which higher order schemata were construed from lower order schemata and concepts.

Because of the limitations associated with equilibration as a process to explain the development of new knowledge, this construct was supplemented with a new one, the concept of transformation (Feldman 1989). Creativity is a transformational activity that leads to new knowledge. Transformation had the purpose of creating newness in the context of stable equilibration (in knowledge and thinking). Feldman (1989) saw creativity as evidence that children's knowledge and thinking does develop.

Development of creativity in infants

In young children, creative action and learning are linked with general mental development. Some researchers, (for example, Urban, 2002) see creativity and intelligence as being fused in early learning. Young children show an intrinsic motivation to interact with and explore their environments (Schiefele, 1974) in their pursuit of novelty (Hunt, 1965). They display an inherent undirected curiosity for knowledge (Feldman, 1989) by investigating and solving problems they generate (Getzels, 1982). This drive to investigate and understand one's world, to trial and test this understanding from a range of perspectives is one base of creativity (Goleman et al., 1997).

The initial sensor-motor explorative and curious activity is gradually replaced by fantasy and imaginative play. The relationship between play and the creative process is critical for children's development (Piaget, 1962; Hogan, 1988). Freed from the concrete world of reality, they create whole worlds of realities in their play. They express their feelings, curiosity and interest in and

experiences in early drawing, play with toys, questions and play in early language, generating ideas that are novel for them ("accidentally novel interactions", Gehlbach 1991, p. 140). They generate outcomes that are novel. Gradually these activities become more purpose-driven or goal oriented ("purposefully innovative interactions").

Creativity development in the early years of formal education

Developmental trends in creativity show a gradual increase with age but with significant declines in first, fourth and seventh grades, that is at the ages of 5-6, 9-10, and 12-13 (Torrance 1963, 1987). Torrance explained the declines in divergent thinking in terms of the need to adapt, compromise and alter how one accepted social authorities at each of these grade levels. A similar trend, using different tasks for assessing creativity, was reported by Urban (1991). Recent school entrance was shown to be a relevant factor because the 6-year old children who continued at kindergarten scored twice as high than those 6-year olds who began school. The key creative thinking strategy that discriminated between the two 6 year old cohorts was for the criterion of boundary breaking; the children who had begun school had learnt not to break boundaries.

Developmental steps in creativity can also be shown in the qualitative analysis of the drawings of children. The drawings of children aged between 4 and 8 years displayed the following characteristic developmental sequence :

Autonomous scribbling/drawing.	The child scribbles/draws independently of the fragments. The child does not adapt to the information according to the given problem.
Imitation.	Beginning "accommodation"; the child recognises and uses the fragments, but without completing or forming or changing.
Closing/Completing.	First assimilating but still not very creative drawings: the fragments are supplemented or completed and become more or less closed, completed, simple figures: circle, square.
Isolated objectivating /Animation.	Uses own, more complex schemes and assimilation/incorporation of the given fragments by creating/interpreting figures, giving them meaning as single objects and/or creatures, without thematic relation.
Thematic relations.	Figures, objects are drawn/seen/interpreted with an inner relation or thematic dependency structure; an intention of forming/composition becomes recognizable.
Formed holistic composition	High level of creative achievement; all completed and new elements/parts of the drawing contribute to a holistic composition, to a common meaning/theme, which is expressed, too, by the holistic way of formal figural quality of the drawing (that does not necessarily mean high technical artificial drawing skills).

The level of creativity depends on aspects of originality, more-dimensionality, risk-taking, and unconventionality. The stages show a development trend from an egocentric and accommodative behaviour to free intentional creative action resulting in new, original, and societal relevant products, which are new and changed bodies of existing knowledge (Feldman, 1989) and represent "mature creativity" (Cohen, 1989). The trend shows increasing differentiation and integration, with increasing picturing and symbolization, increasing concreteness and abstractness, and increasing complexity of gestalt, meaning and sense.

The influence of socialization through formal education restricts and inhibits rather than fosters creativity (Cropley, 1983). The extent to which the creativity drive leads to novel, original outcomes is highly dependent on the environmental conditions in the early educational institutions.

Urban notes that creativity and intelligence are fused in early learning. The socialization process that children experience when they begin school separates or differentiates the child's knowledge and thinking system into two strands; a creative, intuitive strand and a convergent strand that comprises rational, logical, step by step thinking. Formal education values the latter strand. Factors that influence this split include the education process, the language to which children are exposed and the feedback they receive, the toys that support their play and the media to which they are exposed. Urban notes that dialogue such as *Get the right answer, Go on step by step, That's not logical, Follow the rules* can restrict creativity.

Creativity developmental beyond the early years of formal education.

The notion of transformation as a process for creating novel ideas was mentioned earlier . Creativity in adults is a self-directed transformational activity. The means by which individuals gradually acquire this self directing and managing ability has been studied by Pickard (1990). Pickard reported the following steps in development of transformation as follows:

Pickard (1990) : creativity which expands our experiences and knowledge., but only in the course of time these became increasingly self-directed and intentional.

- the early transformations involve changes and modifications of plans and schemata in adaptation activities in one's environment .
- the transformations become more complex as children age, because they can deal with several ideas simultaneously or in relation to one another.
- children learn to predict and anticipate alternatives, to think in possibilities, or 'what could be'. At this time their transformations have become increasingly independent from immediate, practical exploration.
- with language development, children acquire the ability to think reflectively. This helps them see their activity in manipulating the transformations and in creating. They develop the awareness that their knowledge can be transformed and that they can do the transforming.
- individuals develop knowledge and expertise in particular domains and the transformations of older children and adults are generally in more specialized experiences and knowledge stocks. Thus it might become more and more possible, that results of transformational activity is of over-individual importance and significance.

The transformational activity and therefore creative activities and behaviours, need to be fostered and scaffolded by the children's family and early educational contexts (Hogan, 1988).

The focus on creativity becoming more self-directed and intentional is taken further by Lesner & Hillman (1983) who examined its development over a much broader age span. They proposed three major stages in creative thinking over the life span:

- Creative Internal Enrichment spans the period from birth to the end of adolescence over which time children learn life abilities and evolve their personality based on a stable identity. The creative drive is directed mainly towards one's self. It produces creative outcomes that are unique and valuable for the individual. This period covers the first four stages in Pickard's sequence.
- Creative External Enrichment extends from late adolescence to the middle of the life. It is marked by a gradual transition from a more self-centred orientation to a more externally directed, socially conscious and many-sided orientation. An external creative identity develops, with the individual seeking to share one's creative outcomes with others.

- Creative Self-Evaluation represents the completion of the creative life cycle. It spans from older age until death and is marked by a return to a more narcissistic orientation. The aim is to assess the functions and results of the first two steps, to evaluate, to bring them into balance and to accept them together with the inevitable approaching of death.

Creativity in this sequence requires the successful development of a personality and identity, which is dependent on the emotional as well as the cognitive "well-being". Both areas need to be supported and nurtured by an individual's family, school and professional life.

An assumption of this sequence is that creativity is not a characteristic restricted to a few people, but is in everyone. Individuals differ in the extent to which they develop their creative abilities and influence their culture. The fact that only a small portion of a culture make creative contributions to it, argue Lesner and Hillman, is not evidence that everyone does not have the capacity to be creative. They define creativity as the ability to see things from new perspectives, to integrate experiences, thoughts and feelings into personality, to look for new solutions to old problems and to gain insights.

Family conditions and development of creativity

The influence of the family environment on the development of creative thinking has been studied from several perspectives.

Family demographics Divergent thinking has been shown to be influenced by the age difference between siblings in a family but not by factors such as the number of siblings or by gender (Gaynor & Runco, 1992). The observation that the larger age difference, particularly when the child is younger than siblings, was associated with higher the divergent thinking ability may be attributed to the child having greater access to independent play, particularly if the child is younger than siblings and has older siblings as more mature models for creative thinking and activity.

Quality of family interaction and educational style of parents. The effects of educational behaviour and attitudes towards creativity development on creative thinking are ambiguous (Fu et al., 1983; Miller & Gerard, 1979; Ogeltree & Ujlaki, 1973). We have already reviewed the relationship between stress in childhood and creativity. The effect of emotional binding or warmth in the development of creative abilities (Rejskind, 1982) is complex and studies show both negative and positive links between parental warmth and acceptance and their children's creativity. The earlier discussion showed that low levels of emotional warmth are associated with children's creativity scores. It is also possible that high levels are also linked with higher creativity scores.

The characteristics of families of the more creative adolescents were investigated in a broad-based study that compared these families with those of students who had not displayed high levels of creativity (Dacey, 1989a). The study showed that the families of the more creative students

- made more use of well-defined values to manage behaviours rather than rules. The parents encouraged their children to make decisions and responded to the decision in terms of the relevant value.
- had high levels of parental awareness and support of the unusual patterns of thinking and problem solving abilities of their children from a young age, through encouragement, equipment and support and an acceptance and support of the self-dependent endeavours in problem solving
- valued of humour in regular family interactions

- saw "being different" an advantage; the parents valued their children being "able to see things in a new ways and discovering new ideas" more important than "looking good", very high school marks". The children were encouraged to form positive relationships with others and lived in a social atmosphere of acceptance, which is free from anxiety to make mistakes or to fail.

Several of the creative adolescents mentioned "critical moments" in their lives, when, for various reasons, their self was unusually open for change. They dealt with these events by risk taking, thinking in terms of fantasy, etc. Encouragement and support from parents and family was frequently a feature of these times.

Creativity developmental during the adult years.

As adults grow older, they change how they perceive and experience life as they age. Particular intellectual and emotional qualities continue to develop (Cohen, 2001). Wisdom as a construct integrates knowledge, emotion, experience and brain function and leads to phenomena that are difficult to teach, such as insight. With aging it is easier to define problems and plan multiple strategies to deal with them; "post formal thought." (Sinnott, 1998) that integrate the subjective and the objective, feeling and thinking. At different times in their lives, adults use these developmental gains to catalyse their creativity and explore new ideas or make desired changes.

Increased humans thinking parallels an increase in cellular activity, regardless of age. Brain plasticity and creative potential continue to unfold through new phases of adult physical and emotional development. Cognitive challenges stimulate mental activity, both physically and chemically, at all ages (Diamond, 1993; Diamond, Krech & Rosenweig, 1964). Neuronal activity continues with age. In the age range early 50s - late 70s, dendritic growth at the ends of individual neurons in different parts of the cerebral cortex increases (Flood, Buell , Defiore, Horwitz & Coleman, 1985), the length of individual dendrites increases in different parts of the brain (Flood & Coleman, 1990) and de novo neurons continue to form in different parts of the brain over time (Gould, Reeves, Graziano & Gross, 1999).

Human potential phases in the second half of life Four developmental phases shape creative energy growth and how it is expressed the second half of life (Cohen, 1999 2001). Each phase is shaped by age, history, and circumstances. The phases are:

		Examples
<i>midlife re-evaluation,</i> 40s - 50s	<ul style="list-style-type: none"> creative expression is intensified by a sense of crisis or quest. "midlife crisis,"; adults are motivated by quest energy to re-evaluate their lives and work and make them more gratifying. combines the capacity for insightful reflection with a powerful desire to create meaning in life 	<ul style="list-style-type: none"> Haley published Roots, at age 55. Albright at 45, re-evaluated her life after divorce and began teaching government and hosting foreign-policy discussions
<i>liberation</i> 60s - 70s,	<ul style="list-style-type: none"> creative endeavors charged with added energy of personal freedom that comes both within and externally from retirement. includes translating a feeling of "if not now, when?" into action. people are at ease with themselves and know that making errors won't undo their image; this ---> new context for experimentation. 	<ul style="list-style-type: none"> Laura Wilder in mid-60s recorded "Little House" books. Peace negotiations eg, between Rabin, 71, Peres, 70, and Arafat 64 all with a sense of "if not now, when?".

<i>summing up,</i> 70s - older	<ul style="list-style-type: none"> desire to find larger meaning in our lives by looking back, summing-up and giving back. we see ourselves as keepers of culture and wish to give to others our wisdom and wealth. creative expression; autobiography, story telling, philanthropy, community activism, volunteerism, activities of giving back. summing-up leads to recognising unfulfilled dreams and unfinished business that can lead to a new creative burst 	<ul style="list-style-type: none"> Martha Graham danced until 75 then choreography. This was summing-up. Verdi at 80 composed his Falstaff. He was motivated by looking back at unfinished business of more than a half-century
<i>encore.</i> 80s +	<ul style="list-style-type: none"> creative expression shaped by the desire to make a final statement or additional contributions on a personal or community level take care of unfinished business or approach differently something familiar, affirm life and celebrate one's place in family, community, and in the spiritual realm. 	<ul style="list-style-type: none"> George Abbott, theatre and film director collaborated on Broadway revival at age 107. Sarah Delany at 104, collaborated with her 102-year-old sister to write Having Our Say.

Human potential phases promote new possibilities at later points in life. Awareness of them can help close the gap between recognizing our potential and harnessing it. These phases can:

- set the stage for creative expression in the second half of life
- precipitate a change in the direction of one's creative expression
- provide new energy for one's ongoing creative work
- enable one to become creative in response to loss.

Human potential phases do not automatically produce growth or creative expression. Their potential may be realized through a person's own efforts and/or through the help of others.

