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### **Abstract**

First, we will define social creativity as the production of novel behaviors that can efficiently solve problems occurring within dyads or larger groups, and give examples of these types of creative behaviors in children. Then, we will show how this notion relates to research on social development, through a brief review of the literature, including works by Piaget, Kohlberg, Dodge, Selman, Spivack and Shure, among others. Next, empirical findings concerning social creativity's developmental trends as well as relations between social creativity skills and individual and environmental variables will be discussed. Last, we'll propose perspectives beside the psychological one that could bring valuable insights on how to foster social inventions in future generations, such as the notion of social capital or the gift paradigm.

## **Introduction : Studying the development of social creativity.**

Each of our social interactions takes place within a social system that varies according to the characteristics of the group in which the interaction occurs. Trying to explain the making, functioning and evolution of the numerous social structures in which we live represents one major task for science. As part of this scientific journey, we wish to propose that creative social behaviors may be the “building blocks” of social systems. Accordingly, creative social behaviors, because they fit (by definition) as a social solution, tend to gain approval and later integrate the group's system of social rules.

Some of our contemporary social institutions can be described as very complex constructions, as a result of a long evolution. They bear witness to the contributions of individuals who were successful in imagining novel social change. This type of evidence is much more difficult to gather before adulthood, yet plain observations or interviews of children have long shown the existence of social imagination early in development. For instance, during an interview, a six-year-old girl tells us that the family rule which forbids watching TV after dinner could be circumvented if she informed her parents that her teacher advised the class to watch a particular program. Besides family and school, games between peers form an additional social group in which children can imagine novel rules by proposing to the group the adoption of more challenging/fun ways of playing. As witnessed by Piaget in the first years of his career (Piaget, 1932), the (seemingly) simple marble game is actually the result of a very complex evolution, displaying considerable variability. Field observations conducted by Piaget revealed that the rules of this game differed between towns, as well as between playgrounds within the same school. Moreover, parents reporting on their children playing marbles usually noticed dramatic changes compared to the way previous generations played marbles. The older children interviewed were able to explain the origin of the evolution in marbles' rules: there are times during which players can turn into legislators, and

create new play rules. As Piaget noted, there even exists a growing motivation in children to play “rule making” games. He then related his observations of eight boys aged 10 to 11. On their way to play snowballs, they spent more than 15 minutes on a vote for a president, starting with how to decide on the rules for the vote, then to form two camps, and to define the throwing distances together with each penalty applied in case of deviant behaviors (ibid., p.31).

We consider the previous examples as early manifestations of social creativity. In a first part of this chapter, we try to define this form of expression, and discuss how it can be related to previous research and theories on social development. Next, we present hypotheses on the origins of individual and environmental resources necessary for the development of creative social behaviors, within a multivariate approach (Sternberg & Lubart, 1995). In a third section, we will present how psychological research on social creativity could find additional heuristic perspectives in related fields of research, such as sociology and anthropology. In conclusion, we propose directions for future research and applications of the concept of social creativity, for educators as well as policy makers.

### ***A definition of social creativity***

A sizeable portion of creativity research has been devoted to the study of the effect of social environments on the individual’s creativity. Among others, variables such as family size, birth-order, parenting and schooling style, extra-curricular activities, cultural background and SES have been pointed as potential predictors of individual differences in creativity (Lubart, Mouchiroud, Tordjman, & Zenasni, 2003). In our work, we will also consider the social environment as a primary source of individual differences in creativity. Yet our main focus will be on the types of interactions that creatively shape the evolution of social groups by means of novel and useful social behaviours. Here our main concern will be on the creative nature of pro-social behaviors. In the framework of the broad definition of creativity

(Amabile, 1983; Csikszentmihalyi, 1988; M. A. Runco & Pritsker, 1999; Sternberg & Lubart, 1995), social creativity stems from individual and environmental resources that interact into a dynamic process, itself leading to novel and adapted behaviors. Consequently, in the social domain, we consider behaviors, rather than restricting creativity to creative products, since the type of creativity we focus on relates to the creation and/or improvement of social ties. Thus, objects may be involved in this process, but only as mediators (as in giving or sharing behaviors).

### **Why study the development of social creativity?**

Only a minor portion of creativity studies is devoted to the development of creative social behavior, compared with scientific or artistic creativity. In the adult world, social creativity has somehow been under more scrutiny, as several lines of research have been developed to understand the psychological and sociological forces that underlie organizational activities such as leadership, management and negotiation. In this field, some authors have insisted on the importance of creativity for inter-personal problem solving (Kurtzberg, 1998; Mars, 1981; Mumford & Connelly, 1999; Simonton, 1988). However, the number of developmental investigations with children is surprisingly low. One explanation for the scarcity of empirical studies on the development of social creativity lies partly in the fleeting nature of children's creative productions in this domain. As discussed above, unlike the artistic or scientific domains, children's social creativity is not likely to lead to the production of highly stable and reproducible pieces, but rather to verbal as well as nonverbal sequences of behaviors, which are more challenging to examine and identify as creative. Moreover, within the social development literature, a focus on antisocial (i.e., aggressive) behaviors have been predominant, which resulted in less interest for pro-social skills such as social creativity skills. Hopefully a more recent trend in psychology toward psychologically *positive* functioning may bring increased interest for social creativity.

Even though the concept may be difficult to apprehend, we believe that the study of social creativity in children is highly relevant for at least three reasons. First, it is worth studying social creativity because we should, as adults, parents, scientists or educators, keep in mind the importance of fostering social creativity skills in future generations. Indeed, data from various scientific fields show that we could all benefit from more creative expressions in the social world. Political, economical, epidemiological and ecological reports all point at the need for social/global solutions for problems such as perduring conflicts, depleted earth, increasing worldwide inequalities in access to basic needs such as water, food, and education, as well as rise of psychological distress and psychotropics' consumptions (Watters, 2010). When confronted with this rather bleak reality, only a strong belief in human's ability to imagine new ways of living together allows us to consider our future with some serenity<sup>1</sup>. Thus, it is important to learn more about social creativity, in order to discover how and why some individuals are better able than others to find novel and efficient ways to interact with the social environment, and to devise ways to foster social creativity skills in those who lack these skills. With a better understanding of the origins of individual differences in creative social abilities, we will be able to inform and intervene on relevant educational issues.

Second, because cognitive psychology and cognitive sciences, since inception, have been strongly oriented toward ecological problem solving (i.e., object-oriented problem solving) at the expense of relational problem solving (Dunbar, 1998), research on the development of social creativity has relevance as it contributes to knowledge –building in social problem solving. As a side effect, a creative social problem solving approach may bring forth results that could in turn be beneficial to general or object-oriented problem solving models.

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<sup>1</sup> As Gaudin (Gaudin, 2005) noted, even Cassandra is not pessimistic. If she really were, she would not speak up.

One last reason pertains to the specific benefit of investigating social creativity in developing individuals. We believe that a developmental approach not only has relevance for developmental psychologists and educators, but also for scientists who wish to understand how adult social creativity occurs, as uncovering the pattern of acquisition of creative abilities may offer insights. Incidentally, comparing children and adults on the way they participate in the making of their social worlds might offer explanations for the existence of barriers to adult social creativity. We thus may find answers to the question of how the adult has become, in the words of Piaget (1932), a “slave to past custom, to the expense of the permanent rules of rational cooperation (p. 50)”.

Next, we further describe our understanding of social creativity, considering the different forms of creative social behaviors that can be listed, as well as concepts that can be associated with it.

### **Two dimensions in social creativity**

To better represent the nature of creative social interactions, we propose to describe it along two main dimensions : degree of novelty and the size of the social group in which the behavior fits. We can thus position any creative social behaviors on this two-dimensional space. One axis derives from the psychological-historical continuum posited by Boden (1992). Accordingly, a behavior may span from psychologically creative if it is novel to the individual (and possibly known to others in time and space), up to historically creative if the behavior is the first occurrence in human history. On this view, historical creativity represents a sub-sample of psychological creativity. Social creativity thus spans from small behavioral change each time we use a behavior that is novel to us (but known to others) in order to solve an “everyday” social problem or improve a social situation, up to groundbreaking social inventions and practices that dramatically alter the groups’ social rules.

A second axis pertains to the size of the social group in which social creativity is observed. Novel social behaviors are relevant (or not) to groups of various sizes, from dyadic relations to larger groups. Within dyads, we propose that social creativity is expressed each time the two parties cooperate in order to increase their mutual well-being. As the size of the group increases, social problems to be solved become more complex and require societal creativity, as expressed in the lives of union, political and religious leaders and followers. At the very end of the group size dimension lies social creativity concerned with future generations. One example of such large scale creativity (or “creativity in the domain of the future”; see Csikszentmihalyi, (2006) is the fundamental rule devised in Native American tribes such as the Sioux Nation, whose council’s decisions are said to be taken with the well-being of the tribe’s seventh generation as the ultimate objective. One social invention that may gain historical status in our larger social group is Rees’ ecological footprint assessment (Rees, 1992), which aptly illustrates how some of our “modern” behaviors may be unfit for our collective survival.

At any given moment, a creative social behavior can thus be positioned in this two-dimensional space. Yet a creative behavior realized in a group can sometimes move upward on both psychological-historical and group size dimensions, if it is performed by a growing number of individuals in a coordinated fashion, as in large scale protests, boycotts, or uprisings.

### **Related notions and concepts**

That children often behave in novel and adapted ways in social contexts is well known to developmental psychologists. Within this field, research has been devoted to the development of prosocial behaviors such as altruistic behaviors (for a review, see (Eisenberg, Fabes, & Spinrad, 2006). More broadly, the creative nature of human beings’ social life has

long been recognized. Within many (if not every) culture are stories of socially clever characters (such as the Fox in La Fontaine's Fables, or Ulysses in Homer's Iliad and Odysse), whose success reside more on social abilities than sheer physical strength. Concepts closely related to social creativity are behavioral creativity (in Guilford's Structure of the Intellect model, (1967; 1988), moral creativity (Bergson, 1919; Gruber, 1993; Haste, 1993; Richards, 1993; Mark A. Runco, 1993; M. A. Runco & Nemiro, 2003) and moral development (Kohlberg, 1976; Piaget, 1932; Rest, Narvaez, Bebeau, & Thoma, 1999), as well as collective creativity (Family, 2003). In addition, the similarities between the concepts of intelligence and creativity could be particularly strong in the social realm (see Sternberg, 1999, for additional perspectives on the link between intelligence and creativity). Social problems need creative solutions, and thus social abilities entail creative abilities as well. Consequently, social creativity research draws from previous studies focusing on inter-personal (Gardner, 1983, 1993), social (Frederiksen, Carlson, & Ward, 1984; Thorndike, 1920), emotional (Mayer, Salovey, & Caruso, 2000), and practical (Sternberg, Wagner, Williams, & Horvath, 1995) intelligences.

Among early investigators of creativity, the social nature of human life was fully acknowledged. For example, in his attempt to organise the various types of creative imagination, Ribot (1906) proposed an "utopian" or "moral" imagination. According to Ribot, this form of imagination follows from the socially constructed nature of moral judgements, as morality stems from the inventions of moralists. His examples include stories of individuals who in some ancient cultures were forerunners in opposing human sacrifice, or in the personal story of prophets or philosophers, who first devised novel religious, philosophical or political systems, then devoted their lives to both its practice and transmission. In the same vein, Bergson (1919) considers moral actions as one of the highest forms of human creativity. More recently, moral creativity has been defined as "vision, efficacy and responsibility" by Haste



(1993), who advises teachers to foster moral creativity in the classroom (see also Runco & Nemiro, (2003). How children acquire the ability to give moral judgments to social situations is closely linked to their ability to solve social problems creatively.

### **Social creativity within social development**

Only social behaviours that are both adapted to the context and novel at least to the self can fit into our definition of social creativity. Not every social act can thus be equated to a creative act, as many social behaviours simply stem from mere learned routines. In these instances, the child simply applies a known solution to a known social situation. But the child's social world is also filled with situations that range from not-so-well-known to completely novel. In each of these situations, social creativity may be required, as routines solutions may not be fitted.

The widening of social life varies from one child to another. For example, when some are seen as popular and able to create long-lasting friendships, others display difficulties to integrate social groups or to connect with peers. Three psychological perspectives have been proposed that could explain the observed developmental differences in social skills : (1) the functional perspective proposed by Spivack and Shure (1974) and Dodge (1986), (2) the structural perspective elaborated by Piaget (1932) and Kohlberg (1968), (3) and the integrated perspective developed by Selman and collaborators (Robert L. Selman, 1981; R. L. Selman, Beardslee, Schultz, Krupa, & Podorefsky, 1986; Yeates & Selman, 1989). Each of these will be discussed for their insights relevant to the development of social creativity.

#### Social problem solving in a functional perspective

Spivack and Shure (1974) originated a series of studies that aimed at implementing intervention programs in kindergarten and primary schools. One important goal of these

intervention programs was to train teachers to promote social problem solving skills in their pupils. In their theoretical framework, which lay the groundwork for both intervention programs and assessment tools, discrepancies in social problem solving abilities could be explained in terms of discrepancies in one or more of the components of the problem solving process. Thus interpersonal conflicts are meant to be solved by means of a series of distinct social information processing operations. Three social abilities were judged to be essential: (1) the ability to determine the causes of a social situation, (2) the ability to formulate the consequences of the social behavior and (3) the ability to generate strategies for solving interpersonal problems. Each ability identified by Spivack and Shure has relevance to social creativity. Each draws on divergent thinking (see Runco, this volume), a mode of thinking that is central to creativity. In addition, divergent thinking is not promoted as a general ability, but in socially oriented cognitive tasks. Accordingly, when facing a social problem, a divergent mode of thinking in both interpreting social situations and finding solutions will increase the likelihood of finding a socially creative answer.

This approach to social development was further developed by Dodge (1986), who elaborated a functional model of social problem solving. According to Dodge, social problem solving is merely the interpersonal form of the more general problem solving process. Indeed, his model can be related to previous information processing approaches (Guilford, 1967; Newell & Simon, 1972) as well as to the cybernetic communication model by Wiener (1948). Dodge's sequential model includes five steps: (1) encoding of social cues, (2) interpreting these cues, (3) generating strategies, (4) evaluating the efficacy of each strategy generated, and (5) choosing and enacting a strategy (see Crick & Dodge, 1994, for precisions on this model). At the end of this process, a behavioral response from one of the participant in the interaction is then encoded by another participant or participants, who can in turn engage in a similar process. As his social problem solving basic framework parallels the

classical creative process model (Wallas, 1926), Dodge's perspective is interesting for social creativity, and can be considered as one tentative model of the social creativity process.

### Social problem solving in a structural perspective

A different perspective on development--the structural perspective--proposes that abilities (social or else) go through a universal and constant series of stages, each corresponding to the unfolding of distinct abilities. The structural perspective has gained attention in developmental psychology via the works of Piaget, in some of which aspects of social development were examined (1932). This approach provides an additional framework in which social creativity development can be considered. According to Piaget, one central moment in children's social development is when they reach autonomy in moral reasoning, as opposed to an earlier heteronomous stage. We can draw from this perspective that higher levels of social creativity should be observed in the latter stage, since it allows for more complex interactions, integrating moral principles such as cooperation and reciprocity. Older children (around 12) actually explained that creating new game rules is a rather common behaviour, and that the legitimacy of the change is based on group members' mutual agreement. Yet Piaget did not provide a precise account of how children reach the creativity-compatible moral reasoning stage. He merely emphasized the role of peer interactions--especially in collective games--over interactions with adults. Contrary to most interactions with adults, he wrote, interactions between peers allows for a more balanced practice of cooperation and reciprocity.

### Selman's mixed approach to the development of social problem solving

After proposing a sequential development of decentration in a Piagetian framework, Selman and collaborators (Selman et al., 1986; Yeates & Selman, 1989) attempted to integrate the functional and structural perspectives when considering interpersonnal negotiation

strategies (INS) in children. Their INS model is structural as it is grounded on Selman's previous model of development of decentration, proposing four successive stages in negotiation strategies (0) impulsive, (1) unilateral, (2) reciprocal, and (3) collaborative/cooperative. In addition, Yeates and Selman explain how transitions occur between developmental levels. In their view, reaching an upper level can be possible only if lower stage strategies become inefficient. When checked, the child must reflect on the causes of this failure. Then negotiation schemes must be restructured through a creative accommodation process in order to reach equilibrium, in the Piagetian sense. The INS model is also functional as it derives in part from Dodge's (1986) social information processing model. Yeates and Selman's model delineates four recurring process in social exchange : (1) problem definition, (2) generation of alternative solutions, (3) selection of the strategy most suited to the situation, and (4) evaluation of consequences.

Crossing functional and structural perspectives enables Yeates and Selman (1989) to describe, in a given interactional context, the decentration level of the child as well as the type of process used in dealing with social information. In addition, the INS model proposes interpersonal orientation (from self to other transformation) as a relevant source of individual differences in negotiation. Yeates and Selman believe that these two ways of apprehending the social environment represent a major source of individual differences, previously documented as assimilation-accommodation (Block, 1982), or externalization-internalization (Achenbach & Edelbrock, 1978). In the first three levels of the INS stage model, this differentiation between self and other transformation helps showing that very different behaviors actually belong to the same developmental stage (such as to obey or to order). At the first stages, interactions between children follow the negotiating frame of a zero-sum game (Von Neumann & Morgenstern, 1947) : the gains of one participant amount to the losses of another. Only in the highest stage (the cooperative stage) are self and other transformation

orientations blended together. Indeed, at this level, an equilibrium is reached between participants' perspectives, possibly leading to a satisfying resolution for both parts. We can thus hypothesize that the final cooperative level should be the level most compatible with full fledged social creativity. In this stage, negotiating is done according to the frame of a non-zero sum game: the sum of the losses (or concessions) of each party is less than the common winnings. In addition, Selman and Yeates's model of interpersonal negotiation strategies provides a useful and multipurpose frame for investigating the development of social creativity, as it includes both a "divergent thinking" (idea generation) as well as a "convergent thinking" stage. Also, the INS model makes specific predictions on the strategies preferentially used at each age. In one study with participants aged between 11 and 16 years (Mouchiroud, 2001), using the INS model as a reference, each of the alternative solutions given to social problems were labelled as belonging or not to the cooperative level by two independent raters. In the first task, children had to imagine creative ways to step into a group of peers playing a collective game during school recess. Children at low stages provided less creative solutions such as bullying, insisting, threaten to tell the teacher, or trade the entrance for candies or help for homework. In more creative cooperative responses, participants attempted to convince others of the benefits of having an additional participant to the collective game ("the game will be more fun with an extra player", "I know a new rule that makes the game more fun to play"). In the second task, participants had to negotiate with parents the permission to watch TV later than usual. Less creative solutions were mostly based on reciprocity, as participants made various promises in order to get permission (make one's bed or clean one's room, help in house chores, get good grades, ...). More creative solutions highlighted the benefits for the two parties, stating for example that the TV program would be very instructive also to parents, or that the program had been advised by the school teacher.

The data shows that the expression of at least one cooperative response in the child's repertoire increases with age in these two social creativity tasks. Our results also indicate strong individual variability. Whereas Selman and Yeates predict the emergence of collaborative negotiations near the 7<sup>th</sup> grade age level. We observe in our sample that more than 20 % of the 5<sup>th</sup> graders (aged 10 to 11 years) already propose at least one cooperant solutions, whereas about 40% of the participants in 9<sup>th</sup> grade (aged 15 to 16 years) never use any cooperant strategies in responding to our two social tasks..

In the following section, we further describe some of the tasks and indices we have been using when assessing children's creative potential in social situations; next, we present the main individual and contextual variables that can account for individual differences in social creativity.

### **Assessing individual differences in social creativity**

The question of how to measure individual differences in social creativity is particularly arduous. As said earlier, contrary to poetry or technical innovation, no tangible product can be examined and assessed. Social creativity often results from countless social interaction rounds between countless number of individuals. In the field of creativity assessment, however, the divergent thinking paradigm probed by Binet (1905; 1908) . and later popularized by Guilford (1950) has been a main source for test adaptation to the social domain. None of Binet's early divergent thinking tasks included in his famous intelligence scale directly concerned the social domain (See Mouchiroud & Lubart, 2006), yet he was careful to examine children's moral development, via open-ended questions such as "What must be done when one has been hit by a classmate without intent ?" or "Why must one judge others based on their actions rather than on their sayings ?" . It can be noted that some of

these items on social life were later integrated to the “Comprehension” verbal sub-scale in several early versions of Weschler’s Tests.

In divergent thinking tasks, participants are invited to give as many creative answers as they can to problems of all kind. Responses are then compared using various indices (**See Runco, in this volume**), such as fluency, originality, flexibility, or creativity measures derived from Amabile’s (1983) consensual assessment technique.

Using pre-tests, we were able to select situations that elicited various verbal responses from children and adolescents (Gambiez, Jacquet, & Mouchiroud, 2006; Mouchiroud & Bernoussi, 2008; Mouchiroud & Lubart, 2001, 2002). Situations were sampled from broad categories, such as interaction with a single peer, a group of peers, parents, teachers, or social problems that concerned society as a whole. In each of these studies, participants’ creative performances in each social creativity tasks (using a fluency index or the mean rating of creativity of each solutions) were positively correlated . This result is consistent with the idea of a general ability accounting for individual differences in social creativity in children aged 6 to 13. Thus, the observed positive manifold generally allows us to derive a composite score of creative potential in the social domain in this age range.

In addition to studying homogeneity of our creative potential scales, we also assessed how children’s social creativity could be predicted by individual and environmental variables. This data will be discussed in the following sections, which presents our multivariate approach to social creativity.

### ***A psychological and multivariate perspective***

Even though a multivariate approach might seem methodologically costly given the large number of potential psychological and environmental factors to be examined, its value lies in its exhaustivity, as we must not take the risk of leaving aside potentially relevant

predictors. Additionally, this framework makes possible investigations of both social creativity in children and groundbreaking social innovations. Different combinations of factors could explain why creativity varies from one individual to another and from one domain of expression to another within the same individual (Lubart et al., 2003). As for other domains of expression, social creativity stems from interactions between cognitive, conative, emotional and environmental variables.

### **Cognitive realm**

In the cognitive sphere, resources needed for social creativity can be divided into fluid/mechanics abilities (or process) and crystalized/pragmatics abilities (or knowledge) (Baltes, 1980; Cattell, 1963). In reviewing the cognitive processes and knowledge relevant to creativity in socialization, we must bear in mind the strong relation between the two, as knowledge is always stored, evaluated, selected, or implemented via processes that are in part cognitive. Social invention relies on various types of social knowledge (Bandura, 2002) such as wisdom-related knowledge (Baltes & Staudinger, 2000; Pasupathi, Staudinger, & Baltes, 2001), including social schemas, scripts, and moral principles. A script may be attached to virtually every type of social situation humans experience in their lives, which represents early on an impressive quantity of knowledge. In each of our social groups, we must then store what the proper behaviors are and what room there is for creative behaviors. In addition, beside social rules, we somehow manage to keep track of others' level of creative potential for social interactions (debts and credits, as in "I owe you one" type of information), and we are able to retrieve and assess this type of knowledge when considering enacting creative interactions.

Concerning mechanics or fluid intelligence, social creativity draws on problem finding (Runco & Chand, 1994) as much as problem solving abilities. We propose to add *problem*



*ranking*, for this ability to prioritize, to compare and rank social problems pertaining to each of the individual's social groups (cf. our "size of the group" dimension, see above) will affect which social problems will be addressed first, and which will be last. In children, the ability to set the creative agenda can be fostered in contexts such as democratic environments that allow both the ranking process to occur and the ranking to be addressed in the chosen order. This entails the possible definition of social problems on local as well as on global issues, in addition to the possibility to perform creative social behaviors targeting each types of issues (see Benchoam, 1993, Haste, 1993, and Runco & Nemiro, 2003, for global problems).

Furthermore, social creativity draws on the abilities to select, encode and maintain social cues in working and long term memory, as well as to compare and bring together social information in a creative fashion. In this research domain, we can also build on studies accounting for differences in children's prosocial development (see a review in Eisenberg et al., 2006).

An additional cognitive prerequisite for social creativity are decentration or perspective-taking capacities, which are necessary to generate and coordinate self and other perspectives. The ability to comprehend other's viewpoint is central to the development of social skills, as it favors the emergence of a more efficient communication, of empathic behaviors, as well as the development of the notion of self, others, and self esteem. In order to be socially creative, children must be equipped with a theory of mind so that they are able to understand basic mental states and know how these mental states can be causally related to each other and to perceptual inputs and behavioral outputs.

As in other domains of creative expression, divergent and convergent thinking play a central role in social creativity. Divergent thinking is crucial in that it enables the individual to generate several solutions when confronted with a social context, increasing the chance of finding a novel and adaptive response. Convergent thinking is also important as the

generation of alternatives leads to creativity only if one is capable to pick the best solution within the time allowed by the context, which can be dramatically short in social exchanges.

Little empirical work has been devoted to the hypothesized relation between cognitive abilities and social creativity. Using a historical sample of renowned creators in the social domain, such as political and religious leaders, Simonton (1997) has shown that the link between IQ and eminence is curvilinear, with a negative slope above IQ of 120. Furthermore, in a developmental framework, our studies have shown only weak correlations (in the .10 to .30 range) between cognitive abilities (WISC's Vocabulary and Similarities subtests) and creative divergent abilities in the social domain (Gambiez et al., 2006; Mouchiroud & Lubart, 2002).

### **Conative realm**

Non-cognitive individual variables include styles and personality. Defined as behavioural preferences, styles are located at the interface between cognition and conation (Martinsen & Kaufmann, 1999). Despite a lack of data in children, we believe that some styles more than others should have a positive impact on the development of social creativity. For example, a legislative style, rather than a judiciary or executive style (Sternberg, 1997), may favour the generation of new ways to interact in a social environment. Field dependency (Witkin & Goodenough, 1981) might also account for individual differences in creative behavior, as field independent adults display more interest toward scientific tasks and object production, whereas field dependents are generally more at ease in social contexts and prefer activities that involve more social contacts.

Research on the link between creativity and personality has led to the identification of relevant traits such as perseverance, risk taking, openness to experience or tolerance for ambiguity (Zenasni & Lubart, 2001). Yet, as for styles, a flexible personality (i.e., displaying

high intra-individual variability) may be better fitted for creative problem solving, as the creative process includes distinct phases that may rely on distinct personality resources. More specifically, creative social behaviors may also depend on specific traits that reflect self vs other orientations, such as sociability, shyness, assertiveness or dominance. As a whole, studies have been inconclusive on the issue of developmental changes in self vs other orientation. This could be explained in part by the difficulty in precisely differentiating assertiveness from dominance in child personality inventories. Whereas the former trait is positively associated with pro-social behaviors, the latter is linked to lower levels of prosociality (Eisenberg et al., 2006). Maybe a fruitful approach to the study of the creative personality in social interactions would be to assess self vs other preferences using orthogonal dimensions, such as personality structures proposing *communion* and *agency* as the two main personality variables (Digman, 1997; Wiggins, 1991).

### **Emotional realm**

As in other modes of creative expression (Russ & Schafer, 2006; Zenasni & Lubart, 2002), emotions are deeply involved in social creativity, in the creative process as well as in the validation of creative behaviors by group member(s). Emotions of various kinds must be expressed and shared (in sympathy) for new social links to grow. Emotions can be of different types in social interactions, either with positive or negative valence, self or other-generated. Some emotions are specifically socially-oriented, such as remorse, shame, embarrassment, guilt, pride, indignation, or empathy. Also, some key emotions may include a cognitive dimension to the affective one, such as in empathy or indignation. Empathy requires both the ability to share the emotional experience of the other person (affective component) and an understanding of the other person's experience (cognitive component). Empathy has actually been under scrutiny because of its connection with altruism—the intention to give at a cost to the self, which will be examined in our section on anthropological perspectives. In children, a

substantial amount of research has been able to connect empathy with the occurrence of pro-social actions (Eisenberg et al., 2006), which allows us to hypothesize a positive link between empathy development and social creativity development.

Another mix of cognitive and emotional aspects is indignation, or altruistic anger, an emotion aroused by something felt to be unfair or wrong, which can translate or not into altruistic punishment. Similarly, jealousy is a social emotion which shares with indignation a negative valence. As for indignation, jealousy could be considered an adaptive emotion--a developmental obstacle, a mental state that must be cleared in order to become aware that other and self motives can differ (Wallon, 1934). Another negative affect that can produce a positive effect on social creativity is the sadness associated with feelings of empathy. Thus, when in a distressing social situation, sadness may help raise levels of social awareness and facilitate social creativity..

Unfortunately, negative emotions can also lead to noncreative social interactions, because they may inhibit or activate specific sets of behaviors, some attached to aggressive scripts, such as using intimidation in response to disagreement between self and one or more peers. When confronted with a social conflict, children may vary in the way emotions spread into their current memory scripts, sometimes leading to the activation of specific aggression-oriented scripts (Berkowitz, 1984).

Positive emotions also participate in the creative process. Consider for example Bergson's approach to creativity (1919), which put a strong emphasis on joy, defined as "a tool given by nature to inform us that our destination has been reached" (p. 23). Bergson considered joy as the best indicator for creative accomplishment, as joy is neither pleasure—for "pleasure is only a trick imagined by nature to get conservation of life from beings"—nor longing for praise—because searching for honours usually hides an unbalanced need for

social recognition<sup>2</sup>. As he writes, « If we follow this line of facts, we find that wherever there is joy, there is creation : the richest the creation is, the deeper is the joy...wealth and consideration obviously count in the satisfaction felt by the creator, but it brings him pleasures rather than joy, and what he tastes of real joy is the feeling of having brought up an organization that works, of having called something to life (p. 23)<sup>3</sup>.”

As a whole, emotions play a key role in the way information about the self and others may be processed. Thus social creativity depends largely on the child’s abilities to understand and regulate his/her as well as others’ emotions.

### **Environmental factors**

Past and present physical and social environments obviously explain significant portions of individual differences in social creativity. Even though individual factors traditionally get more attention than environmental ones in the field of psychology, some studies have shed light on the role of the child-environment interaction in the development of creative abilities. As an immediate setting, the child’s birth rank in the family has been put forward as an important variable for creativity by Sulloway (Sulloway, 1996) who showed that first-borns adults are over-represented in occupations such as physical science, whereas later-borns are more often seen in social sciences or politics. Data on personality dimensions corroborate this finding, as later borns rate higher on traits such as sociability and openness to experience, (two key elements in the socially creative personality), whereas first borns usually place higher emphasis on conformity. According to Sulloway, first birth position, because it

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<sup>2</sup> Bergson adds : « One considers praises and honours in proportion of one’s uncertainty of having succeeded. There is modesty at the bottom of vanity.(p23)”

<sup>3</sup> «... si nous suivons cette nouvelle ligne de faits, nous trouvons que partout où il y a joie, il y a création : plus riche est la création, plus profonde est la joie. ... Richesse et considération entrent évidemment pour beaucoup dans la satisfaction qu’il ressent, mais il lui apporte des plaisirs plutôt que de la joie, et ce qu’il goûte de joie vraie est le sentiment d’avoir monté une entreprise qui marche, d’avoir appelé quelque chose à la vie. » (p 23)

includes an environmentally richer developmental phase as the sole child in the family, should favor the development of the types of cognitive skills measured in classical IQ tests. In contrast, later borns have to “share” their parents with their older sibling from the very first day, which restricts their interactions with them. Alternatively, later borns should experience more interactions with siblings during their developmental years, providing them with more opportunities to negotiate and thus acquire experience in the social realm. Negotiation activities may also derive from the unbalanced physical relationship between siblings, later-borns being driven early on to verbal instead of physical arguments in conflicts. So far, empirical evidence has been much more convincing regarding the “scientific” advantage of first borns (Kristensen & Bjerkedal, 2007; Sulloway, 2007) than the “social” advantage of later borns, the latter being less investigated (possibly for reasons that pertains to the difficulties in assessing social skills assessment).

Parenting style represent an additional key variable in the child’s immediate surrounding. One way to observe the effect of parenting style on development has been Lautrey’s (1980) study on how family structure allows or hinders intellectual growth. Using Piaget’s developmental theory of equilibrium (between assimilation and accomodation) as a starting point, Lautrey posits and operationalizes via a questionnaire three type of family structures. The structure is said “rigid” when parental rules are fixed and when the child has no choice but to obey. In this case, the child’s cognitive development is merely oriented toward assimilation (of the rules). Next, the structure is labelled “random” when no stable rule seems to operate in the family. Here the child mainly has to accomodate to the perturbations associated with an unstable environment, building new schemes for each situations encountered but not getting the opportunity to assimilate new input into these schemes. Only in the third type of family environment is the balance between assimilation and accomodation made possible. A flexible parenting style favours development because this environment

provides both regularities and disruptions, that is family rules to be assimilated, together with situations (perturbations) in which negotiation is acceptable, thus giving the child the opportunity to build new rules in a coordinated fashion with the adult. Lautrey shows that the flexible parenting style is related to better cognitive performances in Piagetian tasks. In one study testing a sample of 6<sup>th</sup> and 7<sup>th</sup> graders (Mouchiroud & Bernoussi, 2008), we found a positive correlation between flexible parenting style and performance in social creativity tasks ( $r = .31, p < .01$ ). One multiple regression model indicates that parenting style can predict a specific portion of the variance in social creativity potential.

At a broader level, socio-economic status may also affect the development of social creativity in several ways. For example, in wealthy countries, children from higher status families are more likely to participate in extra-curricular activities, which in turn is believed to impact the development of creativity (Milgram & Hong, 1999). Children from higher status families also have more chance to experience alternative schooling, in which democratic decision process can be experienced and trained more often than in regular schools. A lack of resources does not however deprive humans from being creative in their social groups. On the contrary, especially harsh social and political conditions can lead to highly creative behaviours, as illustrated in Nordstrom's (1998) study of collective survival in Mozambique during this country's civil war, between 1976 and 1992. As she observes, sophisticated communication and transportation networks were designed by collective contributions of villagers in order to maintain very basic needs such as access to medications, as well as new forms of healing techniques in order to address war traumas.

Linked to the social environment is the physical environment, with its own impact on social creativity. In the past decades, modern technology, and especially computer technology, has brought significant change on the way humans interact in industrialized countries (Gaudin, 2005). One way computers have changed children's (and adult's) social

world is through identification to the machine, for example via intrusion of computer-related metaphors in everyday language, which in turn affects our representations of self and others. A second form of relation between computer technology and social development is through the attribution of a personality to machines, especially computer games (see chapter by Waltz & Epley, this volume). Since childhood, computer games are play companions, much more efficient than television in capturing the child's attention. Because of its interactive nature, the machine-child relation share similar features with real-life human relations, and observations reveal that children readily consider "intelligent" toys such as robot-companions, thinking they are capable of feeling emotions (Turkle, 2005).

This evolving physical environment can affect the way children will develop their social creativity potential. Gaudin (2005) identifies two opposite predictions on that issue. Because of the current increase in solicitations from communicating machines, are there risks that children (and adults) might develop an unbalanced, "scattered" type of personality, partitioned into multiple "softwares", unable to connect each other in a meaningful way ? If true, this confused interactive environment may impede the development of social creativity. Conversely, will the advent of easy-to-access worldwide computer networks favor democratic debates on local and global issues, which in turn could lead to more collective and creative solutions ? Testing these hypotheses are obviously needed, and studies probing the effect of large scale environmental dimensions on children's social creativity remain to be designed (see chapter by Calvert, this volume). So far the literature only provides us with indirect information on this relationship, via data on uncreative social behaviors. For example, studies have revealed the association between violent video games (which represent about 80% of game sales) and aggressive behaviors in children (Anderson, Gentile, & Buckley, 2007; Anderson & Dill, 2000).



This brief overview of environmental variables ends our description of the main factors that affect the emergence of social creativity in children. In the following section, we present viewpoints from other social sciences which we believe can nourish our multivariate approach.

### **A sociological perspective**

As social creativity involves the social world, research on this topic obviously needs the sociological perspective to complement our psychological model. In fact, for social creativity research, the boundary between sociology and psychology could represent more of an impediment than a help. Since its inception, sociology has been concerned with the task of explaining the laws of social change, which implies both creative and negative change. To that end, sociologists themselves integrated psychological processes with sociological ones, as in Durkheim's notion of anomie--to account for psychological distress caused by degraded social conditions. However, concerning creative social change, the sociological perspective only proposes that social creativity is rooted in demographical, technical, religious or economical variables. In a way, our multivariate model of creativity already includes the sociological perspective, and integrates these social and societal dimensions in the creative process, together with individual ones.

Nonetheless, sociologists such as Bourdieu (Bourdieu, 1980; Putnam, 1995) have proposed the concept of *social capital*, which could be considered as the creative "product" (or consequence) in social creativity. Accordingly, less tangible yet as important as physical and human capital stands social capital. Social capital can be tentatively defined as the sum of relations among persons that facilitates individual or group action. More precisely, we can rely on one of the proposals made by Putnam (1995) as we examine the development of social creativity. This author differentiates two forms of social behaviors that create social capital. The first kind is "bonding" behavior, the one that is implemented in existing social relations,

since the very first days, beginning with the attachment behaviors observed between the caretaker and the newborn. Bonding behaviors thus aim at maintaining or improving social interactions in close relationships. The second sort of behavior that create social capital is called “bridging” behavior, expressed when a novel social relation is created between two or more individuals from formerly distinct groups. As Putnam puts it, bonding behaviors act as a “sociological glue”, whereas bridging behaviors is the “sociological lubricant”. For our concern, both are desirable forms of behaviors for social creativity, and as such should be fostered in developmental years. Psychologically speaking, bonding and bridging behaviors should possibly rely on different individual resources or traits, such as agency in bridging behaviors and communion in bonding behavior (Wiggins, 1991). Consequently, an ideal profile could be the extraverted one in Wiggins’ model, which integrates both high levels of agency and communion traits.

### **An anthropological perspective**

Beside sociology, we believe that research on social creativity can thrive in other scientific disciplines. In fact, scientists from various fields such as economics, mathematics, evolutionary biology or cultural anthropology have been converging in the past decades with the common intent to explain the origins of pro-social behaviors. In doing so, many of them actually wish to address the persistent question of our “true” nature --selfish or altruistic. This question is also central to the idea of creativity in social groups, as it asks about the existence of a shared ability (or absence, as in Hardin, 1968), beyond mere self-interest, to create viable and sustainable social environments.

In the past decades, research on the origins of altruism in children and adults have been mostly performed using experimental sharing games that involve at least two partners for one or more rounds of interactions (see for example, Gummerum, Hanoch, & Keller,

2008). During these games, players can usually choose between two or more options along a selfish-altruistic continuum. As a whole, it seems that the classical Rational Actor Theory (RAT) or Rational Choice Theory (RCT), which posits that humans base their decisions on maximizing utility (Binmore, 2005), is being invalidated by an ever rising quantity of experimental data<sup>4</sup> (Axelrod & Hamilton, 1981; Henrich et al., 2005; Milinski, Semmann, & Krambeck, 2002; see also Tversky & Kahneman, 1981), as well as field observations providing additional instances of RAT falsification in every culture. RAT is further negated in developmental years, as altruistic behaviors are observed very early in life. Studies show for instance that many infants as young as 12 and 18 months already display helping behaviors to strangers (Liszkowski, Carpenter, Striano, & Tomasello, 2006; Warneken & Tomasello, 2006). At age 4, children seem to be as much or even more generous than adults in sharing games (Benenson, Pascoe, & Radmore, 2007; Lucas, Wagner, & Chow, 2008). These developmental studies suggest that pro-social behaviors have a partly innate basis, contrary to the idea of altruism as an exclusively learned behavior. In research on altruism, pro-social behaviors are alternatively explained via notions such as egalitarianism (Fehr, Bernhard, & Rockenbach, 2008), indirect or strong reciprocity (Gintis, Bowles, Boyd, & Fehr, 2003; Kruger, 2003), the opportunity for altruistic punishment (Fehr & Gächter, 2002), reputation building (Milinski et al., 2002) via direct observation (Fehr & Fischbacher, 2003) or gossip (Sommerfeld, 2007). The difficulty to disentangle individualistic from altruistic motives in social interactions leads to oxymoronic proposals such as reciprocal altruism (Trivers, 1971), preference for altruism (Andreoni & Miller, 2002) or competitive altruism (Barclay, 2004; Hardy & Van Vugt, 2006; Roberts, 1998). Accordingly, in evolutionary terms, altruistic behaviors are adaptive since long term benefits of signaling one's goodwill through altruism actually surpass the costs of signaling (Zahavi & Zahavi, 1997). Thus,

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<sup>4</sup> Note that this experimental data also reveals that a minority of participants behave in ways predicted by the RAT model.

humans may have inherited features that favor altruism, such as time (or hyperbolic) discounting (Ainslie, 2005), or reputation investment bias (Heintz, 2005).

The search for a theory that could articulate the self and other motives in the creation of social links has long been a central issue in cultural anthropology, at least since Marcel Mauss' ethnological essay on gift (Mauss, 1990/1924). A nephew and intellectual heir of Durkheim, Mauss first examined and compared particular forms of gift behaviors in several cultures. By looking at agonistic (or combative) offerings ceremonies such as potlaches<sup>5</sup>, one of Mauss' conclusion was that most (if not all) of our social exchanges involve competition for (pro)social excellence via gifts of all sorts, both material and/or spiritual. Mauss proposed the existence of a basic human drive to create bonds through social gifts, ruled by "a series of rights and duties to consume and to return, corresponding to rights and duties to offer and to receive (p 90)".

According to Caillé (2000), Mauss' discovery of the triple obligation to give, receive and return explains why humans play the creative game of association and alliance and invite others into this game. Competition exists<sup>6</sup>, but is *subordinated* to a social impulse, a somehow irrational "bet on trust" we make in our social interactions, yet a conditional bet that can be terminated whenever one feels betrayed. Thus, for Caillé as well as for other maussian scientists (cf the bi-annual journal *La Revue du MAUSS*), there is primacy of altruism over selfishness : cooperation cannot stem from selfishness, via a hypothetical original social contract, yet selfishness can stem from (dysfunctional) cooperation, as demonstrated in several experiments using public goods games (Fehr & Fischbacher, 2003).

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<sup>5</sup> Caillé (op.cit.) defines potlaches as prestige gifts that oblige.

<sup>6</sup> « Etre le premier, le plus beau, le plus chanceux, le plus fort et le plus riche, voilà ce qu'on cherche et comment on l'obtient. »

« Be the first, the most beautiful, the luckiest, the strongest, the richest, that's what one searches and that's how one gets it. » [that is, in participating to the circulation of gifts] (p236).

For Mauss (1990/1924), human interactions are of two kinds, with no midpoint between them : “to defy completely or to confide completely”<sup>7</sup>; to fight (or flight), or to be socially creative through the circulation of debts initiated by gifts. In Caillé’s own framework, the (psychological) tension between self interest and other-regarding preference is crossed by the (sociological) tension between obligation and spontaneity (i.e., creativity). This double opposition, he says, explains why gift behaviors cannot be explicated solely via person-centered methods (such as psychology or evolutionary biology) or holistic methods (such as sociology), who each consider only half of the gift paradigm. In individualistic perspectives, gifts are either self-interested or sacrificial, and in holistic ones, they are either a ritual or a non sense. In Caillé’s words, “social bond is constructed neither starting from individual rational interest nor from an overarching and eternal law (p7).” Indeed, neither social whole precedes individuals nor individuals precede society, because each creates the other through the endless inter-relations and inter-dependencies that bond them. As a consequence, Caillé restates Mauss’ plea for the reunion of psychology and sociology into a general and more heuristic social science, which we believe will enable us to focus on the dynamic of social links.

To conclude this discussion of the anthropological Maussian perspective, we can observe that competitive altruism and reciprocity have long been identified in ethnology as the relevant explanation for human cooperative interactions. As this type of exchange is at the core of social creativity, we are further convinced to the necessity to examine social creativity through a multivariate and multi-disciplinary approach. In addition, the double continua proposed by Caillé, opposing creativity and obligation, as well as opposing other and self-regarding preferences, seem to fit nicely with bi-dimensional personality theories discussed in the previous section on the sociological perspective (Wiggins, 1991). We must then expect

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<sup>7</sup> « se confier entièrement ou se défier entièrement » (p245)

large intra individual variability if each of our social relations are supposed to involve this double opposition/contradiction. Yet, if Caillé's anti-utilitarianism can predict strong intra individual variability, it does not rule out possible stable inter-individual differences.

Compared with inter-cultural studies (Henrich et al., 2005), inter-individual differences studies in pro-social behaviors are rather scarce (However see Koole, Jager, van den Berg, Vlek, & Hofstee, 2001; Sheldon & McGregor, 2000) and should be promoted if we wish to design a full-fledged developmental model of social creativity.

### **Fostering social creativity in developmental years**

As we have been attempting to show, individual differences in the development of social creativity can be accounted for in a multivariate model that integrates several individual and contextual variables. As many of these variables have been identified, a next step for social scientists is to consider assisting children who lack these relevant resources. Educating social creativity can be implemented by fostering creative skills and social knowledge (Aber, Jones, Brown, Chaudry, & Samples, 1998; Botvin, Schinke, & Orlandi, 1995; McGuire & Papageorgis, 1961; Spivack & Shure, 1974), as well as remediation programs centered on emotion management, self-efficacy reinforcement (Bandura, 2002; Benchoam, 1993) or change in social contexts such as school context (Freinet, 1990; Piaget, 1932). Promoting social creativity could lead not only to positive social change, but also to individual change, as the ability to grow and sustain friendships and group membership is associated to reduced health factors (Hawkey, Burleson, Berntson, & Cacioppo, 2003). In the school environment, the problem consists in finding what will best prepare the child to its future role as world citizen. As Piaget asked, "Is it the habit of external discipline acquired under the unilateral influence and constraint by adults, or is it the habit of interior discipline, of mutual respect

and self-government ?<sup>8</sup>” (p 292). Along with Piaget and other proponents of alternative schooling methods, we believe that the introduction of programs that foster the exercise of democracy in schools could be beneficial to children’s development. Thus, we believe that more school time should be devoted to debate and knowledge-based consensual group decisions. At the more global scale, if after all “economic man” proves to be “altruistic man”(Godbout, 2000), if the « tragedy of the commons» can be avoided (Van Vugt, 2009), then political institutions should favor the experimentation of innovative social forms, such as more democratic ones.

## **Conclusion**

In this chapter, we argued the case for more research on children’s social creativity, as research remains primarily focused on object problem solving in developmental years, in spite of the ubiquity of social problems that must be solved creatively in one’s life. Also, we should focus in future research on the development of children’s ability to identify and rank social problems, as these abilities will impact how--and how quickly --future generations will imagine solutions to today’s full range of interpersonal, community and societal problems. Next, we believe that Caillé’s anti-utilitarian theory (2000), based on Mauss’ notion of gift (1990/1924), could account for the seemingly contradictory findings reported in research on the selfish vs. altruistic nature of the child issue. If both selfish and altruistic motives co-exist in young infants as in adults, this may imply large inter and intra-individual variability in related personality dimensions. More importantly, anti-utilitarianism does not rule out the existence of selfishness in children, but posits the preeminence, in cultures as in individuals, of alliance over self-interest, and of creativity over obligation, as the reverse could not explain

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<sup>8</sup> « Est-ce l'habitude de la discipline extérieure acquise sous l'influence du respect unilatéral et de la contrainte adulte, ou est-ce l'habitude de la discipline intérieure, du respect mutuel et du *self government* [in english in the original text] ? »

the building of social groups. Finally, even though some research lends support to an innate basis for fair and altruistic behaviors in children, culture and education also play a key role in their development (Campbell et al., 2008). Thus, knowing that social creativity can be fostered should encourage teachers and educators to carry on their social and societal deeds.

### References

- Aber, J. L., Jones, S. M., Brown, J. L., Chaudry, N., & Samples, F. (1998). Resolving conflict creatively: Evaluating the developmental effects of a school-based violence prevention program in neighborhood and classroom context. *Development and Psychopathology, 10*(2), 187-213.
- Achenbach, T. M., & Edelbrock, C. S. (1978). The classification of child psychopathology: A review and analysis of empirical efforts. *Psychological Bulletin, 85*, 1275-1301.
- Ainslie, G. (2005). You can't give permission to be a bastard : Empathy and self-signaling as uncontrollable independent variables in bargaining games. *Behavioral and Brain Sciences, 28*(6), 815-816.
- Amabile, T. M. (1983). *The social psychology of creativity*. New York: Springer-Verlag.
- Anderson, C., Gentile, D., & Buckley, K. (2007). Violent video game effects on children and adolescents: Theory, research, and public policy. In. New York, NY US: Oxford University Press.
- Anderson, C. A., & Dill, K. E. (2000). Video games and aggressive thoughts, feelings, and behavior in the laboratory and in life. *Journal of Personality and Social Psychology, 78*(4), 772-790.
- Andreoni, J., & Miller, J. H. (2002). Giving according to GARP : An experimental test of the consistency of preferences for altruism. *Econometrica, 70*(2), 737-753.



- Axelrod, R., & Hamilton, W. D. (1981). The evolution of cooperation. *Science*, *211*(4489), 1390-1396.
- Baltes, P. B. (1980). Integration versus differentiation of fluid/crystallized intelligence in old age. *Developmental Psychology*, *16*(6), 625-635.
- Baltes, P. B., & Staudinger, U. M. (2000). Wisdom: A metaheuristic (pragmatic) to orchestrate mind and virtue toward excellence. *American Psychologist*, *55*(1), 122-136.
- Bandura, A. (2002). Social cognitive theory in cultural context. *Applied Psychology: An International Review*, *51*(2), 269-290.
- Barclay, P. (2004). Trustworthiness and competitive altruism can also solve the 'tragedy of the commons'. *Evolution and Human Behavior*, *25*(4), 209-220.
- Benchoam, E. D. (1993). Art refuge and protest : Autobiography of a young political prisoner in Argentina. *Creativity Research Journal*, *6*, 111-128.
- Benenson, J. F., Pascoe, J., & Radmore, N. (2007). Children's altruistic behavior in the dictator game. *Evolution and Human Behavior*, *28*(3), 168-175.
- Bergson, H. (1919). *L'Energie spirituelle [Spiritual energy]* (132 ed.). Paris: Presses Universitaires de France.
- Berkowitz, L. (1984). Some effects of thoughts on anti- and prosocial influences of media events: a cognitive-neoassociation analysis. *Psychological Bulletin*, *95*(3), 410-427.
- Binet, A., & Simon, T. (1905). Méthodes nouvelles pour le diagnostic du niveau intellectuel des anormaux. *L'Année Psychologique*, *11*, 191-244.
- Binet, A., & Simon, T. (1908). Le développement de l'intelligence chez les enfants. *L'année psychologique*, *14*, 1-94.
- Binmore, K. (2005). Economic man - or straw man ? *Behavioral and Brain Sciences*, *28*(6), 817-818.

- Block, J. (1982). Assimilation, accommodation, and the dynamics of personality development. *Child Development*, 53, 281-295.
- Boden, M. (1992). *The Creative Mind*. New York: Basic Books.
- Botvin, G. J., Schinke, S., & Orlandi, M. A. (1995). School-based health promotion: Substance abuse and sexual behavior. *Applied & Preventive Psychology*, 4, 167-184.
- Bourdieu, P. (1980). Le capital social: notes provisoires. *Actes de recherches de sciences sociales*, 31, 2-3.
- Caillé, A. (2000). *Anthropologie du don [Anthropology of Gift]*. Paris: La Découverte.
- Campbell, J., Schermer, J. A., Villani, V. C., Nguyen, B., Vickers, L., & Vernon, P. A. (2008). A behavioral genetic study of the dark triad of personality and moral development. *Twin Research and Human Genetics*, 12(2), 132-136.
- Cattell, R. B. (1963). Theory of fluid and crystallized intelligence : A critical experiment. *Journal of Educational Psychology*, 54, 1-22.
- Csikszentmihalyi, M. (1988). Society, culture, and person : A systems view of creativity. In R. J. Sternberg (Ed.), *The nature of creativity : Contemporary psychological perspectives* (pp. 325-339). New York: Cambridge University Press.
- Csikszentmihalyi, M. (2006). *La créativité: Psychologie de la découverte et de l'invention [Creativity : Psychology of discovery and invention]*. Paris: Robert Laffont.
- Digman, J. M. (1997). Higher-order factors of the Big Five. *Journal of Personality and Social Psychology*, 73, 1246-1256.
- Dodge, K. A. (1986). A social information processing model of social competence in children. In M. Perlmutter (Ed.), *Minnesota Symposia on Child Psychology* (Vol. 18, pp. 77-125). Hillsdale, NJ: Erlbaum.
- Dodge, K. A., & Tomlin, A. M. (1987). Utilization of self-schemas as a mechanism of interpretational bias in aggressive children. *Social Cognition*, 5(3), 280-300.

- Dunbar, R. I. M. (1998). The social brain hypothesis. *Evolutionary anthropology*, 6, 178-190.
- Eisenberg, N., Fabes, R. A., & Spinrad, T. (2006). Prosocial development. In N. Eisenberg (Ed.), *Handbook of child psychology, Vol 3, Social, emotional, and personality development, 6th edition* (pp. 646-718). New Jersey: Wiley.
- Family, G. (2003). Collective creativity: A complex solution for the complex problem of the state of our planet. *Creativity Research Journal*, 15(1), 83-90.
- Fehr, E., Bernhard, H., & Rockenbach, B. (2008). Egalitarianism in young children. *Nature*, 454(7208), 1079-1083.
- Fehr, E., & Fischbacher, U. (2003). The nature of human altruism. *Nature*, 425, 785-791.
- Fehr, E., & Gächter, S. (2002). Altruistic punishment in humans. *Nature*, 415, 137-140.
- Frederiksen, N., Carlson, S., & Ward, W. C. (1984). The place of social intelligence in a taxonomy of cognitive abilities. *Intelligence*, 8(4), 315-337.
- Freinet, C. (Ed.). (1990). *Co-operative Learning and Social Change: Selected Writings of Celestin Freinet*. Toronto: Ontario Institute for Studies in Education Press.
- Gambiez, T., Jacquet, A.-Y., & Mouchiroud, C. (2006). Aspects émotionnels des différences individuelles dans la créativité sociale : une étude chez l'enfant [Emotional aspects of individual differences in social creativity : a study in children]. In C. Houssemand, R. Martin & P. Dickès (Eds.), *Perspectives de psychologie différentielle* (pp. 89-92). Rennes: Presses Universitaires de Rennes.
- Gardner, H. (1983). *Frames of mind: The theory of multiple intelligence*. New York: Basic Books.
- Gardner, H. (1993). *Creating minds*. New York: Basic Books.
- Gaudin, T. (2005). *La prospective*. Paris: Presses Universitaires de France.
- Gintis, H., Bowles, S., Boyd, R., & Fehr, E. (2003). Explaining altruistic behavior in humans. *Evolution and Human Behavior*, 24, 153-172.

- Godbout, J. T. (2000). *Le Don, la dette, l'identité - Homo donator vs homo oeconomicus [Gift, Debt, Identity- ]*. Paris: La découverte.
- Gruber, H. E. (1993). Creativity in the moral domain: Ought implies can implies create. *Creativity Research Journal*, 6(1-2), 3-15.
- Guilford, J. P. (1950). Creativity. *American Psychologist*, 5, 444-454.
- Guilford, J. P. (1967). *The nature of human intelligence*. New York: McGraw-Hill.
- Guilford, J. P. (1988). Some changes in the structure-of-intellect model. *Educational and Psychological Measurement*, 48(1), 1-4.
- Gummerum, M., Hanoch, Y., & Keller, M. (2008). When child development meets economic game theory: An interdisciplinary approach to investigating social development. *Human Development*, 51(4), 235-261.
- Hardin, G. (1968). The tragedy of the commons. *Science*, 162, 1243-1248.
- Hardy, C. L., & Van Vugt, M. (2006). Nice Guys Finish First: The Competitive Altruism Hypothesis. *Personality and Social Psychology Bulletin*, 32(10), 1402-1413.
- Haste, H. (1993). Moral creativity and education for citizenship. *Creativity Research Journal*, 6(1-2), 153-164.
- Hawkey, L. C., Burleson, M. H., Berntson, G. G., & Cacioppo, J. T. (2003). Loneliness in everyday life: Cardiovascular activity, psychosocial context, and health behaviors. *Journal of Personality and Social Psychology*, 85(1), 105-120.
- Heintz, C. (2005). The ecological rationality of strategic cognition. *Behavioral and Brain Sciences*, 28(6), 825-826.
- Henrich, J., Boyd, R., Bowles, S., Camerer, C., Fehr, E., Gintis, H., et al. (2005). 'Economic man' in cross-cultural perspective: Behavioral experiments in 15 small-scale societies. *Behavioral and Brain Sciences*, 28(6), 795-855.
- Kohlberg, L. (1968). The child as a moral philosopher. *Psychology Today*, 2(4), 25-30.

- Kohlberg, L. (1976). Moral stages and moralization: The cognitive developmental point of view. In T. Lickona (Ed.), *Moral development and behavior: Theory, research, and social issues* (pp. 31-53). New York: Holt.
- Koole, S. L., Jager, W., van den Berg, A. E., Vlek, C. A. J., & Hofstee, W. K. B. (2001). On the social nature of personality: Effects of extraversion, agreeableness, and feedback about collective resource use on cooperation in a resource dilemma. *Personality and Social Psychology Bulletin*, 27(3), 289-301.
- Kristensen, P., & Bjerkedal, T. (2007). Explaining the relation between birth order and intelligence. *Science*, 316(5832), 1717.
- Kruger, D. J. (2003). Evolution and altruism. Combining psychological mediators with naturally selected tendencies. *Evolution and Human Behavior*, 24, 118-125.
- Kurtzberg, T. R. (1998). Creative thinking, cognitive aptitude, and integrative joint gain: A study of negotiator creativity. *Creativity Research Journal*, 11(4), 283-293.
- Lautrey, J. (1980). *Classe sociale, milieu familial, intelligence [Social class, family environment, intelligence]*. Paris: Presses Universitaires de France.
- LeMare, L. J., & Rubin, K. H. (1987). Perspective taking and peer interaction: Structural and developmental analyses. *Child Development*, 58(2), 306-315.
- Link, B. G., & Phelan, J. C. (1996). Understanding sociodemographic differences in health--The role of fundamental social causes. *American Journal of Public Health*, 86, 471-473.
- Liszkowski, U., Carpenter, M., Striano, T., & Tomasello, M. (2006). 12- and 18-Month-Olds Point to Provide Information for Others. *Journal of Cognition and Development*, 7(2), 173-187.
- Lubart, T. I., Mouchiroud, C., Tordjman, S., & Zenasni, F. (2003). *La psychologie de la créativité [Psychology of creativity]*. Paris: Armand Colin.

- Lucas, M. M., Wagner, L., & Chow, C. (2008). Fair game: The intuitive economics of resource exchange in four-year olds. *Journal of Social, Evolutionary, and Cultural Psychology*, 2(3), 74-88.
- Mars, D. (1981). Creativity and urban public leadership. *Journal of Creative Behavior*, 15(3), 199-204.
- Martinsen, O., & Kaufmann, G. (1999). Cognitive style and creativity. In M. A. Runco & S. R. Pritsker (Eds.), *Encyclopedia of Creativity* (Vol. 1, pp. 273-282). New York: Academic Press.
- Mauss, M. (1990/1924). *The Gift: forms and functions of exchange in archaic societies*. London: Routledge.
- Mayer, J. D., Salovey, P., & Caruso, D. (2000). Models of emotional intelligence. In R. J. Sternberg (Ed.), *Handbook of intelligence* (pp. 396-420). New York, NY, US: Cambridge University Press.
- McGuire, W. J., & Papageorgis, D. (1961). The relative efficacy of various type of prior beliefs-defense in producing immunity against persuasion. *Journal of Abnormal and Social Psychology*, 62, 327-337.
- Milgram, R. M., & Hong, E. (1999). Creative out-of-school activities in intellectually gifted adolescents as predictors of their life accomplishment in young adults: A longitudinal study. *Creativity Research Journal*, 12(2), 77-87.
- Milinski, M., Semmann, D., & Krambeck, H.-J. (2002). Reputation helps solve the 'tragedy of the commons'. *Nature*, 415, 424-426.
- Mouchiroud, C. (2001). *La créativité dans le domaine des interactions sociales: une approche différentielle et développementale [Creativity in social interactions: A differential and developmental approach]*. René Descartes University - CNRS, Paris.

- Mouchiroud, C., & Bernoussi, A. (2008). An empirical study of the construct validity of social creativity. *Learning and Individual Differences, 18*(4), 372-380.
- Mouchiroud, C., & Lubart, T. I. (2001). Différences individuelles dans le développement de la créativité sociale : Etudes transversales chez l'enfant et l'adolescent [Individual differences in the development of social creativity : cross-sectional studies in children and adolescents]. In A. Flieller, C. Bocéréan, J.-L. Kop, E. Thiébaud, T. A.-M. & J. Tournois (Eds.), *Questions de psychologie différentielle* (pp. 363-368). Rennes: Presses Universitaires de Rennes.
- Mouchiroud, C., & Lubart, T. I. (2002). Social creativity: A cross-sectional study of 6- to 11-year-old children. *International Journal of Behavioral Development, 26*(1), 60-69.
- Mouchiroud, C., & Lubart, T. I. (2006). Past, present and future perspectives on creativity in France and French-speaking Switzerland. In R. J. Sternberg & J. C. Kaufman (Eds.), *International handbook of creativity* (pp. 96-123). New York: Cambridge University Press.
- Mumford, M. D., & Connelly, M. S. (1999). Leadership. In M. A. Runco & S. R. Pritzker (Eds.), *Encyclopedia of creativity* (Vol. 2, pp. 139-145). New York: Academic Press.
- Newell, A., & Simon, H. (1972). *Human problem solving*. Englewood Cliffs, NJ: Prentice-Hall.
- Nordstrom, C. (1998). Terror warfare and the medicine of peace. *Med Anthropol Q, 12*(1), 103-121.
- Pasupathi, M., Staudinger, U. M., & Baltes, P. B. (2001). Seeds of wisdom: Adolescents' knowledge and judgment about difficult life problems. *Developmental Psychology, 37*(3), 351-361.
- Phelan, J. C., Link, B. G., Diez-Roux, A., Kawachi, I., & Levin, B. (2004). 'Fundamental Causes' of Social Inequalities in Mortality: A Test of the Theory. *Journal of Health and Social Behavior, 45*(3), 265-285.
- Piaget. (1932). *Le jugement moral chez l'enfant [The child's moral judgment]*. Paris: PUF.

- Putnam, R. (1995). Bowling alone. *Journal of Democracy*, 6(1), 65-78.
- Rees, W. E. (1992). Ecological footprints and appropriated carrying capacity: what urban economics leaves out. *Environment and Urbanization*, 4(2), 121-130.
- Rest, J. (1974). Judging the important issues in moral dilemmas: An objective measure of development. *Developmental Psychology*, 10(4), 491-501.
- Rest, J., Narvaez, D., Bebeau, M., & Thoma, S. (1999). A neo-kohlbergian approach : The DIT and Schema Theory. *Educational Psychology Review*, 11(4), 291-324.
- Ribot, T. A. (1906). *Essay on the creative imagination*. Chicago: Opencourt.
- Richards, R. (1993). Seeing beyond: Issues of creative awareness and social responsibility. *Creativity Research Journal*, 6(1-2), 165-183.
- Roberts, G. (1998). Competitive altruism : From reciprocity to the handicap principle. *Proceedings of the Royal Society, Biological Sciences*, 265(1394), 427-431.
- Runco, M. A. (1993). Creative morality: Intentional and unconventional. *Creativity Research Journal*, 6(1-2), 17-28.
- Runco, M. A., & Chand, I. (1994). Problem finding, evaluative thinking, and creativity. In M. A. Runco (Ed.), *Problem finding, problem solving, and creativity* (pp. 40 - 76). Norwood, NJ: Ablex.
- Runco, M. A., & Nemiro, J. (2003). Creativity in the moral domain: Integration and implications. *Creativity Research Journal*, 15, 91-105.
- Runco, M. A., & Pritsker, S. R. (Eds.). (1999). *Encyclopedia of creativity*. New York: Academic Press.
- Russ, S. W., & Schafer, E. D. (2006). Affect in Fantasy Play, Emotion in Memories, and Divergent Thinking. *Creativity Research Journal*, 18(3), 347-354.
- Selman, R. L. (1981). The development of interpersonal competence: The role of understanding in conduct. *Developmental Review*, 1(4), 401-422.



- Selman, R. L., Beardslee, W., Schultz, L. H., Krupa, M., & Podorefsky, D. (1986). Assessing adolescent interpersonal negotiation strategies: Toward the integration of structural and functional models. *Developmental Psychology*, 22(4), 450-459.
- Sheldon, K. M., & McGregor, H. A. (2000). Extrinsic value orientation and 'the tragedy of the commons'. *Journal of Personality*, 68(2), 383-411.
- Simonton, D. K. (1988). Creativity, leadership, and chance. In R. J. Sternberg (Ed.), *The nature of creativity : Contemporary psychological perspectives* (pp. 386-426). New York: Cambridge University Press.
- Simonton, D. K. (1997). Creative productivity: A predictive and explanatory model of career trajectories and landmarks. *Psychological Review*, 104, 66-89.
- Spivack, G., & Shure, M. B. (1974). *Social adjustment of young children. A cognitive approach to solving real-life problems*. San Francisco: Jossey-Bass.
- Sternberg, R. J. (1997). *Thinking styles*. Cambridge: Cambridge University Press.
- Sternberg, R. J., & Lubart, T. I. (1995). *Defying the crowd : Cultivating creativity in a culture of conformity*. New York: Free Press.
- Sternberg, R. J., Wagner, R. K., Williams, W. M., & Horvath, J. A. (1995). Testing common sense. *American Psychologist*, 50(11), 912-927.
- Sulloway, F. J. (1996). *Born to Rebel: Birth Order, Family Dynamics, and Revolutionary Genius*. New York: Pantheon.
- Sulloway, F. J. (2007). Birth Order and Intelligence. *Science*, 317, 1711-1712.
- Thorndike, E. L. (1920). Intelligence and its use. *Harper's Magazine*(140), 227-235.
- Trivers, R. L. (1971). The evolution of reciprocal altruism. *Quarterly Review of Biology*, 46, 35-57.
- Turkle, S. (2005). *The second self: Computers and the human spirit*. Cambridge, MA, US: MIT Press.

- Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, 211(4481), 453-458.
- Van Vugt, M. (2009). Averting the tragedy of the commons: Using social psychological science to protect the environment. *Current Directions in Psychological Science*, 18(3), 169-173.
- Von Neumann, J., & Morgenstern, O. (1947). *Theory of games and economic behavior*. Princeton: Princeton University Press.
- Wallas, G. (1926). *The art of thought*. New York: Harcourt, Brace.
- Wallon, H. (1934). *Les origines du caractère chez l'enfant. Les préludes du sentiment de personnalité*. Paris: Boivin.
- Warneken, F., & Tomasello, M. (2006). Altruistic Helping in Human Infants and Young Chimpanzees. *Science*, 311(5765), 1301-1303.
- Watters, E. (2010). *Crazy like us : The globalization of the american psyche*. New York: Free Press.
- Wiener, N. (1948). *Cybernetics*. New York: Wiley & Sons.
- Wiggins, J. S. (1991). Agency and communion as conceptual coordinates for the understanding and measurement of interpersonal behavior. In W. M. Grove & D. Cicchetti (Eds.), *Thinking clearly about psychology: Vol. 2. Personality and psychopathology* (pp. 89-113). Minneapolis, MN: University of Minnesota Press.
- Witkin, H. A., & Goodenough, D. R. (1981). *Cognitive styles, essence and origins*. New York: International University Press.
- Yeates, K. O., & Selman, R. L. (1989). Social competence in the schools: Toward an integrative developmental model for intervention. *Developmental Review*, 9(1), 64-100.
- Zahavi, A., & Zahavi, A. (1997). *The handicap principle : A missing piece of Darwin's puzzle*. New York, NY: Oxford University Press.

Zenasni, F., & Lubart, T. I. (2001). Adaptation française d'une épreuve de tolérance à l'ambiguïté: Le M.A.T. French adaptation of a test of tolerance of ambiguity: The Measurement of Ambiguity Tolerance (MAT). *European Review of Applied Psychology/Revue Européenne de Psychologie Appliquée*, 51(1-2), 3-12.

Zenasni, F., & Lubart, T. I. (2002). Effects of Mood States on Creativity. *Current Psychology Letters*, 2(8), 33-50.