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Gabriel Mugny and Felice Carugati
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1 From intelligence to its social representations

Is there such a thing as intelligence? It may seem paradoxical to ask this question after spending more than ten years researching into the social psychology of cognitive development, but the paradox is only superficial: Intelligence, with a capital 'I', is a cultural creation which is central to modern society but which varies according to historical period, latitude and social circumstances. The fact of these variations makes it impermissible to talk about intelligence as a single entity; and yet we use the term every day and are capable of making confident judgements about the intelligence of people we meet, with every appearance that the term is unproblematic. Nevertheless...

Proof of the plurality of meanings of the concept of intelligence is to be found in the variety of definitions provided by intelligence specialists themselves. Sternberg and his fellow-workers (1981) describe a symposium held about sixty years ago at which fourteen experts of considerable standing (such as Thorndike and Terman) were invited to express their views on the nature of intelligence. The conference ended by deciding that there were as many definitions as there were experts, even though there seems to have been a consensus surrounding two, admittedly very general, ideas: namely that intelligence comes down first to the ability to learn from experience, and second to the ability to adapt to the environment. We find an even greater divergence when the views of these English-speaking specialists, the product of a specific scientific culture, are compared with the approach of Piaget and his followers. There is not a great deal in common, therefore, between the definitions of intelligence provided by psychometricians using a variety of tests to assess intelligence quotients (IQ) and Piaget's definition; and although there may occasionally turn out to be a correlation between measurements of IQ and results from a battery of operational tests, this is hardly significant, as the epistemological foundations of the definitions are radically different.

The same is true of the development of intelligence and therefore for different sorts of developmental psychology. Even where there is agreement on how it should be measured (as for instance by a Piagetian operational battery), researchers have differing views on the nature of development and

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the conditions favourable to it. Some require observation (or in some cases reinforcement) of the correct response, others insist on positive or negative reinforcement (rewards and punishment), while others again will introduce internal conflicts between schemes or patterns of reasoning, or socio-cognitive conflicts between peers, or between adult and child, or will want to reformulate cognitive problems in terms the child can understand, and so on. It seems clear, therefore, that there is no unified theoretical explanation for the development of intelligence either. In addition to this, these different conceptions result in the recommendation of widely divergent educational practices, as witness the heterogeneity of the learning processes and tested experimentally by developmental psychologists (see Strauss, 1972; Strauss and Langer, 1970; Lefebvre-Pinard and Reid, 1980).

If epistemological conceptions of intelligence vary from one researcher to the next, depending on the school of thought they belong to (for historical reasons which could be established, but which we shall not be examining here), just as their theories of development and their more pragmatic approaches to learning processes vary, it must surely be legitimate to assume that a similar heterogeneity, perhaps even more marked, is to be found in the 'common-sense' or 'everyday' conceptions of the man in the street.

It is these social representations of intelligence and its development as recorded at the everyday level, rather than by 'experts', which this book is concerned with. The reasons for studying them are not merely fortuitous, and they stem neither from an attempt to find a way out of an impasse in which we are unable to decide between rival 'expert' positions, nor simply from a temporary, circumstantial interest in social representations because they happen to be fashionable in social psychology. This kind of study is in fact a necessary stage in the development of our own theoretical and experimental approach to cognitive development. This we shall hope to show in the first section of the book, which takes us from the social psychology of cognitive development to the study of representations of intelligence. In the third section we shall tackle the conceptualisation of the socio-cognitive operations implied in the dynamics of these social representations (which will then be illustrated by a broad social psychological study), but before that, in the second section, we shall look at some important issues raised by such a study.

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From genetic social psychology to the study of social representations of intelligence

The 'social': a postulate is not enough

There is a solid tradition of thought about the phylogenetic and historical development of the higher cognitive processes which sees them as a consequence of man's interaction with his social, rather than physical, environment. As long ago as 1864 Cattaneo, a precursor of this tradition, believed that new ideas arose from the meeting of different minds, and that they could not be the product either of people working in isolation or of people who agreed among themselves. For Durkheim and Mauss (1969), mental operations involving classification, for instance, were first developed in order to define individuals' membership of social categories such as clan, phratry, tribe and so on. It would therefore be because men grouped themselves, and thought of themselves, in terms of categories that they mentally grouped and classified other beings, until eventually the two sorts of grouping merged into one. Similar arguments have recently been advanced by ethologists (Chance and Larsen, 1976; Humphrey, 1976). In this context, too, intelligence is defined as the individual's capacity to adapt to his environment, but seen initially as a process of adaptation to a social milieu which in turn enables adaptation to the 'physical' milieu, insofar as the species adapts to it. It would thus be through the mediation of social relations that the human being would interact most efficiently with his physical environment. This argument is also implicit in Moscovici's (1968) approach, where he puts forward the idea of studying the human history of nature.

At this very general level of assertion there is (as Doise's historical outline (1985a) shows) a clear consensus among writers otherwise as divergent as Baldwin (1913), Mead (1934), Vygotsky (1962; 1978), Wallon (1969; 1976) and Piaget (1965), to the point where it is possible to conclude that there exists a real postulate of the social (Doise, 1978a) in developmental psychology.

Despite this, psychological research has failed to accomplish the task which Baldwin set specifically for genetic psychology, namely to specify those forms of social interaction which enable individuals to develop. Mead's followers, for instance, moved rapidly into the study of definitions of the self and interiorisation of values within symbolic interactionism (see Carugati, 1979). Vygotsky's pupils, for their part, have not succeeded in clarifying the mediations between social and cultural change and the development of cognitive functioning, only the connections between which have so far been revealed (see, for example, Luria, 1971). As for Piaget, he developed a parallelistic conception (see Doise, 1986) of the connections between social

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and intellectual development which, by denying any causal relation between them, actually hindered the development of a real socio-psychological explanatory perspective in the Piagetian tradition.

The limitations of this hypothesis of the social therefore become clear from its failure to inspire any studies that set out to define the mechanisms by which the social mediates in the establishment of cognitive processes. Nonetheless, several works have set out over the last ten years or so to try to remedy these omissions, all belonging to the current we refer to as genetic social psychology.

The socio-psychological approach to cognitive development

Genetic social psychology is an expanding subject composed of the various research currents which, for a little over ten years, have been trying to accomplish Baldwin's wish by laying the foundations for a transition from a bi-polar (subject–object) psychology to one that is tri-polar (subject–other–object), to use Moscovici's terminology (1970). Uniting the diversity of approaches, though, there is a characteristically social constructivism, and a similarly social interactionism.

It has to be recognised that the cognitive approaches which adopt the former standpoint, whether they are Piagetian or behaviourist in inspiration, have generally defined intelligence as an individual's adaptation to an environment which is seen in non-social terms. Genetic social psychology asserts a radically divergent viewpoint, defining those psychological factors which are seen as concerned with intelligence as being basically social in nature. The cognitive instruments which the child is induced to work out at the various stages of his development are not primarily reactions to be increasingly both differentiated and integrated into general systems (what Piaget calls logical operations) as a response to a non-social milieu; they should instead be seen as so many mental patternings elaborated by the child in and for social interactions with his peers and with the significant adults in his environment.

The child whose development this new discipline sets out to understand is not any longer, therefore, the idealised *epistemic subject* of Piagetian theory, but a socially integrated child who works out his cognitive instruments in and through his integration into multiple social relationships, at family and peer-group level, and through his experience of school. In this perspective the social is not merely epiphenomenal, brought in as an additional factor which may alter the course of development from time to time, but – in the form of the child's specific social experiences – is actually constitutive of his social and cognitive ontogenesis (Mugny, 1985b).

In this approach the main problem is thus to describe the multiple dynamics at work in these experiences, and to explain how they induce,

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counteract, modify and in fact provide the main outlines of the child's development up to adulthood. This sort of socio-psychological study of individual development, as the recent collection edited by Doise and Palmonari shows (1984), looks at the development of interaction between young children, patterns of interaction and family lifestyles, control techniques in different models of socialisation, the modalities of interaction in nurseries, the modes of language acquisition and the development of communication, the collective building-up of cognitive instruments and social awareness, the processes of socialisation and the development of identity in adolescence up to and including the changes that accompany the entry into work and citizenship. Another collective work (Mugny, 1985a) focusses more specifically on the development of the child's cognitive processes, and includes several studies which clarify the theoretical foundations of genetic social psychology and pull together the various different approaches to social learning by looking at the collective processes of interaction, communication and working out the meaning of cognitive tasks, the effects of which are not only studied experimentally–in the laboratory situation but also set in the context of a new approach to teaching processes. In the following section, therefore, we shall outline the main features of genetic social psychology.

The social construction of intelligence

We can now outline the main features of our socio-psychological approach to cognitive development, which is founded upon a significant amount of experimental research (see Doise and Mugny, 1984; Perret-Clermont, 1980), and which views cognitive instruments (in the broad sense of the term, but particularly the operations described in the Piagetian tradition) as the gradually constructed product of the child's social interaction with peers or adults. This conception goes further than Piagetian parallelism because it assumes a causal connection between social development and cognitive development. This connection, however, has to take the form of a spiral, a sequence of causality moving from one to the other and back again. Our postulate is therefore that participation in social interactions ensures the formation of new, more balanced, cognitive instruments, which enable the child to participate in further, more complex, interactions, which in turn enable new cognitive formulations to be made, and so on. The child's intellectual or cognitive level is thus no more than an abstraction, since a 'transverse' analysis only allows us to define a sort of state, or stage, which is simultaneously a consequence of earlier social experiences and the source of new socio-cognitive experiences.

Moreover, although social interactions play a structuring role, the degree of structuration varies between different moments in the formulation of a

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notion or of a particular cognitive instrument; their role is most evident, and therefore directly observable, in the initial moment of a formulation. In fact before this initial stage, and as a precondition of its occurrence, the child has to work out what we regard as 'prerequisites' (thus, for instance, for conservation of number to be possible, the child must be able to establish correspondences between terms, and must know his numbers), and these in turn will be the product of earlier social formulations. Once this initial phase of development has been achieved, children are capable of working out these new cognitive instruments on their own. The interdependence necessary to the first stage of the co-elaboration of a new cognitive instrument is, in fact, followed by a gradual process of becoming self-reliant, based upon that earlier interdependence. This sequential model of the effects of a structuring interdependence (for an experimental illustration of which see Mugny and Doise, 1979), takes account of the difficulty sometimes experienced in showing the superiority of collective work over individual work; for this to be done, the prerequisites must already have been formulated, but a moment of self-reliance not yet have been reached. This view has the further advantage that it does not result in a simplistic opposition (of a sort still widespread) between individual and collective work, because it links the two together; its efficacity is based on the already existing cognitive and social abilities of the partners in the interaction, and ensures the subsequent efficacity of the individual work.

Social interaction does, therefore, have structuring power at certain stages in the development of a notion: but what is the alchemy by which it is achieved? We can dispose at the outset of one 'easy' explanation: the child does not progress simply because it is shown the correct model for solving a problem or by positive reinforcement (or negative reinforcement of wrong answers), or at least not solely. The child would, anyway, still have to possess the prerequisites enabling him to grasp the logic of the problem, which is not always clear (Kuhn, 1972). We can thus ignore behavioural or behaviourist explanations (see Bandura, 1971, 1977; Rosenthal and Zimmerman, 1978; Staats, 1975). Even in the most recent versions of social learning theory (for a review of which, see Mugny, Lévy and Doise, 1978) the dominant idea is still that interaction with the correct model (or simply observation of it) is what lies at the source of development. This view is not unproblematic, however: at the ontogenetic level it is difficult to understand how, in these terms, peers could progress without assuming that there is always a partner who is already aware of the correct model; it is a conception which is hard to sustain at the phylogenetic level, too, because it does not take into account the historical evolution of the cognitive instruments that the human race has had to develop at one point or another in the course of its evolution, except by assuming an apriorism, or

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reinforcement of random changes which turn out to be adaptive, which is the kind of explanation which nowadays seems less and less conceivable in any serious sense. In our view, in short, the child does not simply interiorise a ready-made cognitive instrument or a new way of thinking: he can only formulate these through social interactions.

If, therefore, the structuring powers of social interaction are not derived from observation of the correct model, nor from reinforcement, their dynamic must, as we have shown elsewhere (see Carugati and Mugny, 1985) be socio-cognitive conflict.

The notion of socio-cognitive conflict does, of course, figure in individualist theories of genetic psychology. To take only one example, Inhelder, Sinclair and Bovet (1974) interpreted the learning of cognitive structures as the result of a re-establishment of internal equilibrium following cognitive conflicts caused by a simultaneous confrontation with cognitive schemes or ways of thinking which were contradictory because they were different in kind. The writers then formulated an ingenious set of learning procedures which provided children with an opportunity to confront these contradictory ways of thinking and thereby integrate them into more elaborate cognitive instruments. Here, though, the notion of disequilibrium, like that of re-equilibration, derived from a view of dynamics as strictly internal to the individual subject, whereas everything in fact points to their being fundamentally social in origin.

We have therefore adopted the notion of conflict, but this time placed it within interpersonal relations; hence the term socio-cognitive conflict. The central idea of our model is this, that social interaction structures individual development through the conflicts of response, or the conflicts of communication (the term is Smedslund's, 1966), which it is capable of giving rise to. Cognitive development is therefore regarded as a gradual, step-by-step, social construction of cognitive instruments in response to the confrontation, in social interactions, of contradictory schemas or ways of thinking which are each at first defended by one of the participants. Cognitive progress thus consists of a gradual co-ordination between the child's own schemas or ways of thinking and those of others, which are then integrated into general systems, which can integrate the initially contradictory viewpoints in an increasingly logical way, just as perspective enables different views of the same object to be integrated into one general system.

We have illustrated at some length elsewhere the conditions in which these interactions (between peers, or between child and adult) are capable of inducing this sort of socio-cognitive conflict (Doise and Mugny, 1984; see also Carugati, De Paolis and Mugny, 1980–81); it occurs essentially when the participants at first deploy strategies of response which stem from

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different cognitive levels relative to the particular task governing the interaction, or when the participants, even though they may be of the same level, present different concentrations, or when, for example in a task involving spatial transformation, the participants have different standpoints. In the case of adults, he or she can also induce socio-cognitive conflict by recourse to a process of questioning (see Lévy, 1981) similar to the socratic method. But whatever the particular dynamic governing any socio-cognitive conflict, the results of the whole set of experiments demonstrate quite clearly that some socio-cognitive conflict must take place if a social interaction is to give rise to cognitive progress by one or both of the participants, during or after the interaction. Socio-cognitive conflict therefore constitutes a necessary – though, as we shall see in the next section, not the sufficient – condition for a social interaction having a structuring role.

There are several reasons why cognitive progress should be conditional upon this confrontational social dynamic, and they may briefly be enumerated at this point. First of all, such conflicts ensure that the child becomes aware that there are other possible responses than his own. Thus the pre-operational child who, until the age of seven or so, is not aware of his own internal contradictions (and so passes unembarrassedly and easily from one response to another) can, as a result of a social conflict taking place here and now, prepare the way for a de-centring. Then, by his contradictory responses the other participant provides information about other response models. On this point, it should be noted that our theory does not require the contradictory response to be a correct one: children are capable of formulating new ways of thinking out of confrontations with incorrect models (something which constituted the main principle of our experimental demonstrations) by taking their and the other child's errors as a starting point. It is also here that our conceptualisation differs radically from theories of social learning based on observation of or interaction with a correct model. This may of course create a standpoint which is favourable to new socio-cognitive construction, but it cannot ever be considered a *sine qua non*. Nor can that kind of approach, unless it alters its fundamental premisses, explain the positive effect of incorrect models that are at the same level as the child's initial cognitive level, or even lower (Mugny, Lévy and Doise, 1978). The effect of a correct model, on the other hand, fits perfectly well with our conception, as it assumes, in any particular case, a socio-cognitive conflict in which the information needed for the correct answer is nonetheless available.

There are two other aspects. First, social interaction may make the child particularly active, and the Piagetian school has frequently stressed the self-regulatory nature of this activity. But the most important point, and this we

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shall return to in the next section, is that socio-cognitive conflict always challenges the social relations between the participants; although the conflict is also cognitive, it is primarily social, setting up an opposition between the participants. Resolution of a socio-cognitive conflict is therefore also the resolution of a directly interpersonal one.

Things are not as simple as that, however. It is not enough for a conflict of communication between participants to emerge from an interaction: the way the conflict is resolved must also ensure a new cognitive formulation. Obviously this does not always happen. So the argument needs to be taken a step further.

Ways of resolving socio-cognitive conflict

A socio-cognitive conflict does not automatically guarantee cognitive progress on the part of the individuals concerned. The way it is resolved, the modality of its resolution, must consist of a new cognitive formulation. But there are also other possible modalities of resolution, as other dynamics are capable of counteracting this potential progress. We therefore have to take into consideration two major types of modality of resolving socio-cognitive conflict (De Paolis and Mugny, 1985; Mugny, De Paolis and Carugati, 1984), which are to be found even in adult education systems (see Monteil, 1985).

Relational regulations, to begin with the negative side, express dynamics of direct dependence *vis-à-vis* the other, with no modification of the cognitive response. According to this type of regulation, resolution of the conflict aims at solving it from within with the least effort. In asymmetrical social relations, such as with an adult, the child is thus in danger of being limited to behaviour which accommodates to the adult, something we have frequently observed. Admittedly the child may justifiably expect the adult to show greater competence, and therefore should not ignore his responses, but this kind of regulation may be thwarted by the adult himself, particularly by proper use of systematic questioning of his own response as much as that of the child (Lévy, 1981).

Relational regulations of this type are, moreover, not the sole prerogative of the adult. They can also be observed in peer-group interactions, either as a result of asymmetrical sociometric relations, or where there is too great a disparity in cognitive level (in which case a higher level of logical thinking will confer a greater degree of necessity on the answers, and thus ensure a stronger behavioural consistency which may result in unilateral domination (see Emler and Glachan, 1985)). We have also frequently noted that progress in peer-group relations happens more often when the structure of decision is bilateral or reciprocal than when it is unilateral or strongly asymmetrical. Finally, it seems that children sometimes just juxtapose their

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contradictory responses, without making any attempt to integrate them into a single, collectively thought-out resolution. In all these instances, the relational regulations work against the co-formulation of a level of reasoning higher than that which the children showed themselves capable of in pre-tests.

On the other side of the coin, we define as socio-cognitive the regulations of socio-cognitive conflict which consist of the working out (by both participants, or by one or the other) of a new response model which integrates the initially divergent centrations without, however, denying them. Thus two children judging two lines of equal length to be unequal because they are staggered spatially (each choosing a different one to be longer, by each centring on opposite overshoots) can successfully construct the conservation of length and consequently give the (correct) response – that they are of equal length – as soon as they realise, for instance, that the displacements are complementary, and the compensation therefore reciprocal. Here we can say that there is a cognitive regulation, to the extent that no relational dynamic (unilaterality of decision, socio-cognitive asymmetry, etc.) or situational dynamic (asymmetry of status) counteracts it. Collective elaboration therefore takes place within a tissue of complex social relations which extend well beyond the narrowly cognitive framework of the task. And there can be no doubt that developmental psychology has seriously underemphasised, not to say ignored, these dynamics, which are just as much a part of the child's social world as intra-individual cognitive dynamics. In order to grasp these and incorporate them into a theory, we use the notion of social marking.

To begin by defining it (see Mugny and Doise, 1983): social marking defines any socio-cognitive situation in which can be made salient, to some degree, an existing (or potential) correspondence between responses derived from social regulations (governing a symmetrical inter-personal relation between peers, or a relationship between positions in a social structure, as in child–adult relations) and responses derived from the organisation of the cognitive schemas the child has at a given moment of his development. In order to allow or prevent development, as the case may be, this correspondence has to be made salient and the child must be brought to the point where he describes and confronts simultaneously the responses that derive from his cognitive system and those that derive from his system of social awareness. The mechanism which ensures cognitive progress is once again socio-cognitive conflict, because new responses reflecting cognitive progress can only arise out of the confrontation of contradictory responses.

Socio-cognitive conflict can therefore turn out differently, depending on whether the child makes an abstract division or is directly involved in a division between adult and child, or between peers. Similarly a division will

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