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**UNDERESTIMATING THE EMOTION PERCEPTION CAPACITIES OF PEOPLE  
WITH MENTAL RETARDATION**

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**ABSTRACT**

Many studies have reported that children and adults with cultural-familial retardation have problems with tasks involving the recognition of emotions. On the basis of these findings Rojahn, Rabold & Schneider (1995) have proposed that people with mental retardation suffer from a specific deficit in emotion perception. This paper proposes that the case for emotion specificity is not as compelling as Rojahn et al propose and presents alternative conceptual models that may serve as useful aids when designing and appraising future studies, and in thinking about clinical interventions in this area.

## INTRODUCTION

Individuals with cultural familial mental retardation frequently have impairments in social skills, have difficulties in adjusting socially and vocationally, and often develop additional psychopathology. What are the root causes of these social adaptive problems? Are they a consequence of impaired intellectual functioning and poor information processing capacities or are other factors involved?

A number of researchers have reported that in addition to general social skills problems, individuals with mental retardation also appear to have problems with emotion perception. Rojahn, Rabold and Schneider (1995) have suggested that there may be a direct causal link between emotion perception 'deficits' and social adaptive problems. Rojahn et al formulated what they call an emotion specificity hypothesis of mental retardation. They propose that, in addition to general intellectual impairments, people with mental retardation have domain-specific emotion perception deficits, and these may be a cause of social adaptive problems

Although a number of studies such as that of Moffat et al (1995) lend some credence to the view that there is a link between emotion perception deficits and social adjustment there are a number of counter arguments. It is perfectly reasonable, for example, to propose that the link is in the opposite direction to that advocated by Rojahn, Rabold and Schneider (1995), and that emotion perception deficits are a consequence rather than a cause of social adaptive problems (see Sinason, 1992, for a view on this).

Rather than hypothesizing that basic emotion perception is impaired, Moore (in press) has proposed that such capacities may be relatively intact in individuals with mental retardation. For some time Ecological Psychology has proposed that social perception has been wrongly viewed as a top-down cognitive, inferential process. It should not be assumed that humans employ the same processes in perceiving people as they do in perceiving objects. For example: Baron (1980) has proposed that "...there is a certain amount of species level preparedness for the perceptual systems of higher primates to resonate to information relevant to social interaction." (p 594). Ecological Psychologists argue that because social perception is of great importance for human adaptation, perceptual architecture dedicated to perceiving social meanings may have evolved specifically for this purpose. Consequently there is no reason to suppose that these capacities relate to or are constrained by general cognitive

capacities and IQ.

Cognitive psychology has also recognized that there may be relatively direct, bottom-up, input driven, encapsulated, perceptual mechanisms which operate independently of more general cognitive processes (Fodor, 1983). These modular and/or domain-specific<sup>1</sup> cognitive mechanisms may provide basic social meanings to the observer. Recent work with infants has lead to a reappraisal of certain aspects of early social perception. For example, it has been proposed that in the perception of faces, and the interpretation of the causal and goal-directed actions of agents, infants may employ modular mechanisms attuned to specific perceptual patterning (Gergely et al., 1995; Premack, 1990; Leslie & Keeble, 1987; Carey & Spelke., 1994; Morton & Johnson., 1991). Others have proposed that the understanding of the emotional meanings manifest in the 'bodies' of others may involve innate, bottom-up perceptual capacities, and that the accessibility of this information to the infant is of central importance in facilitating and maintaining social-communicative development. For example see Hobson, 1993; Reddy et al, 1997.

Although these proposals do not preclude individuals with mental retardation from having deficits in these areas of functioning<sup>2</sup>, Moore's (in press) suggestion that low-level social-perceptual capacities are intact in individuals with mental retardation fits well with theories of domain specificity and/or modularity. In fact, a recent study has shown that when compared to mental-age-matched typically developing controls, mentally retarded children have spared capacities for remembering faces in comparison to relatively impaired abilities for remembering objects (Dobson & Rust, 1994). Similarly, Moore, Hobson & Anderson (1995) have demonstrated that individuals with mental retardation have spared abilities in the perception of human bodily movements, in contrast with specific impairments in other information processing capacities (see also Anderson & Miller, 1998).

A review by Rojahn, Lederer and Tasse (1995) looked at the methodologies of studies

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<sup>1</sup> Note the distinction between modules and domain-specificity. All modules are domain specific, but domain-specific capacities need not be modular. See Karmiloff-Smith (1992) and Carey and Spelke (1994) for fuller expositions of these issues.

<sup>2</sup> Modularity in cognitive function may not necessarily be represented in localized neurological structures. Neural pathways involved in the implementation of these processes may be distributed throughout the brain and consequently may be affected by general synaptic or neuronal impairments.

investigating the emotion recognition capacities of mentally retarded people, and concluded that to address this issue properly studies must have an adequate control task and include mental age matched control participants. These are extremely important design elements of these types of studies. However, it is also important, even when control tasks and mental matching are employed, to consider any findings in relation to the IQ-related demands of the tasks, and to consider the type and validity of the stimuli employed. It is the contention here that in their review, Rojahn et al (1995) did not fully consider these important design issues.

### **METHODOLOGICAL ISSUES**

When one begins to look at studies done in this area one begins to find that many studies of emotion recognition suffer from a confusion of terminology, interpretation and method. To this end, it is not only necessary to reassess the theoretical accounts given for each study but it is also necessary to see if studies have all the necessary elements of experimental design in place to enable one to determine whether or not a reported deficit is perceptually based, emotion-specific and whether or not it is related to mental age or general intelligence (IQ). Similar analyses have proven useful when considering the nature of emotion perception in individuals with autism (Hobson, 1991) and in children with specific learning disabilities (Maheady, Harper & Sainio, 1987).

#### **Ecological validity**

The first point to bear in mind when setting out to assess a capacity for perceiving certain forms of information, is whether the stimuli used to measure such an ability are truly representative of the domain in question. If they are not, any deficit in performance may not be specific to the domain one is intending to study, but may be related exclusively to processes involved in 'perceiving' and understanding any one of a number of aspects of the particular stimuli employed. These criticisms can be applied to a number of studies undertaken in this area, in particular those using schematic drawings or cartoons which do not reflect real human expressions and may represent some type of learned 'emotional shorthand'. Even the use of stimuli of apparently high ecological validity such as photographs of faces may lead to ungeneralizable findings because of the lack of dynamic movement (Moore et al,

1997).

### **Participant selection and matching**

In relation to chronologically equivalent non-retarded individuals, mentally retarded children not only differ in IQ (the variable that defines each diagnostic group), but also in Mental Age<sup>3</sup>. When comparisons are made between groups of children with and without mental retardation who are not equivalent in Mental Age (MA), one cannot be certain that any differences found in performance between these groups arise because of differences in capacities to execute the process of interest, namely emotion perception, or whether task performance is due to mentally retarded participants' impaired capacities to cope with the demands of the task itself. For example, performance may relate to abilities to verbally label or match any type of stimuli regardless of their emotional content. Thus, one needs to be sure that the groups of individuals with and without mental retardation are equivalent in their abilities to cope with these secondary components of the task.

One step towards determining whether the two groups are equally capable of coping with task-related demands is to match for Mental Age. Although matching groups for MA does not mean that both groups will have exactly the same cognitive structures (Weiss et al, 1986), and there may still be differences in cognitive competence even after matching, it does mean that any potential differences in performance cannot be attributed to differences in the capacity to perform some functions related to knowledge acquisition involved in doing sub-tasks on an IQ test. Of course matching for MA means that under some circumstances individuals with mental retardation may have advantages because of having higher chronological ages (CAs), although it would be difficult to specify what these advantages might be. Additionally one has to consider whether the matching is on measures which test verbal or non-verbal cognitive abilities. If two groups are matched for non-verbal MA, but the target task relies on verbal responding, one can not necessarily assume that performance is unrelated to MA.

### **Secondary Pathologies**

In fact the CA difference may work against individuals with mental retardation. There is an

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3 Mental age could be defined as level of knowledge/skill acquisition, and IQ as rate of acquisition (See Anderson 1992)

issue concerning secondary pathologies. Given that many studies reporting deficits in this area have been done with adults, this is a serious consideration. Sinason (1992) talks of secondary handicap whereby the stigma associated with being handicapped and consequently rejected by society leads in adulthood to withdrawal and detachment from the world. These pathologies manifest themselves in incidences of depression and/or behavior problems and these may lead to poorer performance on emotion identification tasks. Thus, impaired emotion recognition performance may be a consequence rather than a cause of poor social adaptation. This is a serious issue when examining work in this area. Studies done with adults often yield different results to those done with children, and this needs to be considered.

### **Task demands**

The arrival at a meaningful response involves (at least) two components. The first component is determined by capacities in relation to the process under study, in the current case capacities for person perception. However, the second component of overall performance is the ability of participants to cope with task-specific demands. Even if individuals with mental retardation have the same capacities as non-retarded individuals in the first component, it may be that they differ in the second.

Thus, an important issue in devising tasks is to work out exactly what demands each task is making on the participant over and above the capacity to perceive the emotional content of stimuli. Even some seemingly simple tasks require participants not only to perceive a stimulus, but also to encode it, discriminate it from others, and verbally respond to it. Moore (in press) has attempted to come up with a fine-grained (but by no means exhaustive) classification system and this is presented in Table 1. This table splits tasks into five different types and gives an indication of some of the demands each task makes on participants. Consideration of these issues is of particular importance when assessing studies where no control tasks have been administered (more on control tasks shortly), as it allows us to examine which other aspects (apart from emotion recognition) of the tasks administered may account for any differences found between MA-matched groups. Even a fairly simple task requiring a participant to look at one picture of a face and then match it to another, by picking out the same emotion from a selection of five or six other photographs of faces (called here a within-mode matching task), makes significant demands on memory. The participant has to



encode the emotion of the first face and hold this in mind as well as the goal - which is to find a match. Then the participant has to encode the emotional content of the other faces to which the match is to be made, and has to select the match. It is known that in relation to TD children, MA-matched individuals with mental retardation have problems with the transfer of information out of iconic memory for further processing (see Mosely, 1981). Consequently, one has to be circumspect in concluding that it is the emotional content of the stimuli which is responsible for deficits in recognition performance.

[TABLE 1 HERE]

As can be seen from Table 1 all tasks require some memory component even if this is simply the process of remembering what one is being asked to do - i.e. to hold in mind the goal of the task. Thus one has to be sure that it is not these components of tasks which are responsible for differential performance, and this is primary reason for employing control tasks.

### **Index and control tasks**

A critical methodological issue concerns the specificity of an ability or disability, and this is central in the selection of the control task one might employ. If one wishes to demonstrate a specific impairment or indeed a spared ability (see Anderson & Miller, 1998), one needs to demonstrate, using similar experimental techniques, two things. Firstly, that participants are impaired in processing information in the domain in question (i.e. emotion in faces) in relation to MA-matched control participants. Secondly, that when mentally retarded participants are presented with another task involving the processing of information not specific to the domain in question (i.e. age of faces), they are not impaired in relation to the matched controls. Together this would demonstrate that performance on the domain-specific task is not simply determined by general MA- or IQ-related capacities but is specific to the domain in question. However, here we come to a critical issue. This concerns the direct comparability of the index and control tasks. The two tasks need to be of equal levels of difficulty, and need as far as possible to make the same response demands on each group. The concern is how to set up experimental conditions so that in the index task, participants' performance is determined primarily by capacities specific to the domain in question. It is essential to formulate control tasks which are equivalent in the terms of extraneous demands

to the index task, but which do not measure the same target capacities. This is not a straightforward undertaking (See Hobson, 1991).

Even if one has covered the two concerns above there is still an additional issue that requires consideration. Rather than emphasizing the disadvantages that individuals with mental retardation may have in relation to MA-matched controls (for example in terms of poor iconic memory), it is also important to stress the advantages typically developing children may have. Intelligence, as measured by IQ scores, not only reflects the rate with which individuals achieve levels of cognitive competence, but may also reflect general 'mental speed' - the speed with which individuals process information. This superior 'mental speed' may allow non-retarded individuals to process supplementary, peripheral cues more efficiently than MA-matched individuals with mental retardation (Anderson, 1992). In this case, if an index task is not 'restricted' to the perceptual process of interest, then IQ-related information processing abilities may improve non-retarded individual's task performance, and mentally retarded participants may appear impaired when they are not. As Hobson (1991) put it "...there is a danger of creating a setting in which one participant's intuitive emotional sensitivity might confer little advantage over another participant's emotionally insensitive but cognitively effective classification abilities" (p1139).

## **OVERVIEW OF STUDIES**

In a review of studies Moore (in press), has revealed that even with cross-culturally validated photographs (Ekman & Friesen, 1975), there are no consistent findings of emotion perception deficits in individuals with mental retardation in relation to MA-matched non-retarded children. On some occasions individuals with mental retardation appeared as able to identify emotional expressions in faces as MA-matched non-retarded individuals (Hobson, Ouston & Lee, 1989b; Adams & Markham, 1991; Xemeteriou, 1992; Weisman & Brosgole, 1994), and at other times they appeared to be relatively impaired (McAlpine et al 1992; Hobson, Ouston & Lee, 1989a; Rojahn et al 1995). Table 2 summarizes these findings.

[TABLE 2 HERE]

The major point is that, apart from the studies of Hobson, Ouston & Lee (1989a&b), Rojahn et al (1995) and Moore Hobson & Lee (1997), none of the other studies listed in table 2 included all the methodological rigors outlined above. Very few studies assessed performance across MA-matched groups and even fewer employed control tasks to explore the specificity of performance deficits. Also of note was the number of studies that explored performance in adults with mental retardation. Only the studies of Brosgole et al (1986); Adams & Markham (1991); McAlpine et al (1992); Xemeteriou, (1992) and Marcell & Jett (1985) looked at the phenomenon in children. This point is of particular importance given the possibility that secondary pathologies may occur in adults with mental retardation (Sinason, 1992).

It seems that individuals with mental retardation may find the sort of tasks that have been used to assess emotion perception more difficult than CA-matched non-retarded individuals, and may find them more difficult than MA-matched non-retarded individuals. However, it is unclear which aspects of these tasks are problematic, and it is unlikely that these problems solely represent an emotion perception deficit. Only one study (Hobson, Ouston and Lee, 1989a) provided convincing evidence that in relation to MA-matched controls, individuals with mental retardation may have a specific, perceptually-based problem with 'identifying' photographic representations of emotions. Having said this, this task involved the matching of two forms of stimuli (faces and voices), and when the same participants were asked to name these stimuli separately (Hobson, Ouston & Lee, 1989b), no emotion specific impairment was found. It is possible that the process of matching complex representations may require the use of representational or symbolic processes that are IQ-related and that performance may reflect restrictions in other information processing abilities, rather than problems in person-perceptual processes. This view concurs with Weisman & Brosgole (1994) who found that on a simple identification task mentally retarded individuals were not impaired in relation to MA-matched controls, but with an increase in task complexity, errors increased in relation to IQ.

It would appear from these findings that a more elaborate account of the problems found in these populations is required. To this end Moore (in press) attempted to highlight further the complexities of the issues by giving a graphical account of the factors implicated in these tasks (see Figure 1). The diagram shows the influence on performance of the validity of the stimuli, secondary pathologies, and the levels of difficulty of index and control tasks. It is the

contention here that Rojahn et al (1995) do not fully take into account the possibility that IQ-related information processing capacities may differ between two groups of MA- matched individuals with and without mental retardation. Rojahn et al. assume a direct causal link between poor task performance and emotion recognition capabilities, and have underplayed the critical part a control task plays in determining the validity of this link.

[FIGURE 1 HERE]

Figure one gives a graphical explanation of the complex factors that may determine task performance and shows how the impaired performance of children with mental retardation on emotion perception tasks may not necessarily be causally related to specific impairments in understanding of emotions. The critical issue is that without a control task one can not know whether or not performance is determined by IQ-related differences between the two groups (See Moore, in press for a fuller account of these differences). Figure One also illustrates how, even if a specific difference were found on an emotion tasks in comparison with a control task of equal level of difficulty, one still needs to consider other factors. One has to consider the validity of the stimuli themselves and with older participants, secondary handicaps may be involved which may be organic or psychological in origin. Figure 1 does not attempt to make every link between the different areas, for example language abilities may be related to emotional sensitivity, but is intended to highlight the complexity of the issue and this approach may help in designing and assessing future studies in this area.

In summary, it seems that whereas propositions regarding deficits in general social cognition are supportable, the conclusion that individuals with mental retardation have specific person-perceptual deficits and in particular emotion-perception deficits, may not be as compelling as it first appears (Moore, 1994; Moore et al, 1995; Moore et al 1997, Moore, in press). It may be argued that the perceptual problems reported in many studies are in fact task-related problems, and are a consequence of the methodologies employed rather than of perceptual deficits. It may be that individuals with mental retardation are, in fact, as able as typically developing children to perceive basic meanings within a social interaction. Performance difficulties may arise because of IQ-related deficits in verbalization of relations, iconic memory or categorization, all of which may be implicated when responding to complex matching tasks (Weiss et al 1986). Analysis of task demands along the lines of those detailed

in Table 1 may help in assessing how such deficits affect each type of recognition task and allow us to understand the relationship between emotion recognition performance and IQ. Without the use of adequate matching and control tasks, and without thorough consideration of the validity of the stimuli it is difficult to see how the results of any study can be used to make a case for an emotion recognition deficit.

This perspective may help to explain the mixed success in trying to specifically improve emotion recognition performance. If, as is suggested here, there is little evidence to suggest that emotion sensitivity is specifically impaired, then any improvements in performance on these tasks are likely to have been gained through indirect improvements in strategies to alleviate IQ-related difficulties in memory and information processing capacities. Consequently, training may not necessarily be expected to generalize to real world situations where these demands might differ and where, if anything, memory and information processing demands are greater. This is not to say that emotion recognition training should not be undertaken, just that it should not be assumed that what is being improved is the underlying emotional sensitivity of individuals with mental retardation.

In fact, more importantly, the proposal that mentally retarded individuals are as emotionally sensitive as typically developing children requires one to address an important clinical issue. If individuals with mental retardation are able to identify and consequently experience the emotional responses of others, then this in itself may account for the social adaptive problems they often have. Individuals with mental retardation will often encounter social stigma and negative emotional expressions directed at them by others. Because they are sensitive to these negative emotional signals this may lead to low self-esteem and to social withdrawal -or what has been termed secondary handicap. This may be an equally valid causal explanation of the poor social adaptation found in mentally handicapped individuals (again see Sinason, 1992).

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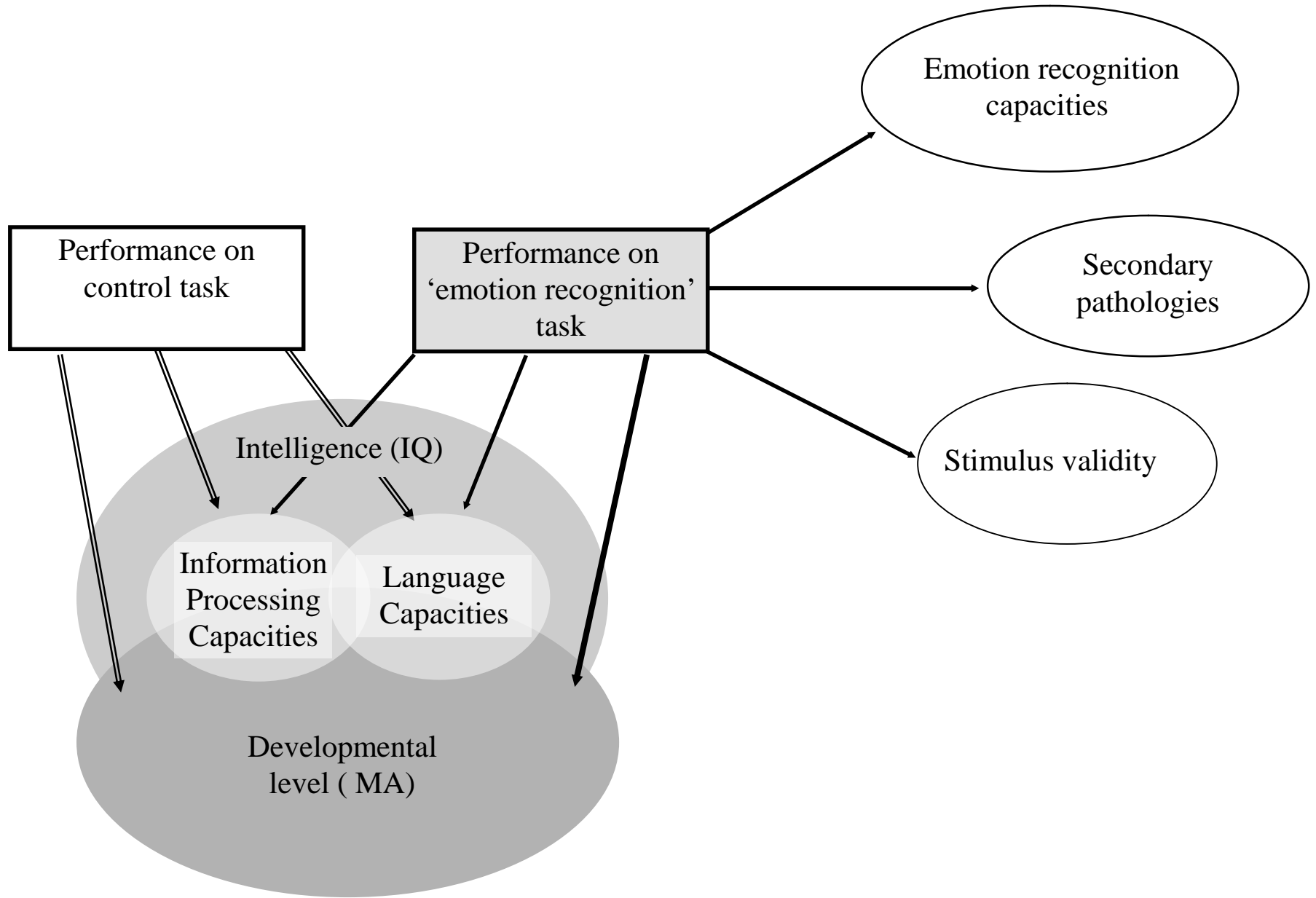


**Table 1: Demands of different types of emotion recognition tasks**

	<b>Labeling</b>	<b>Identification/ Discrimination</b>	<b>Within-mode matching</b>	<b>Cross-modal matching</b>	<b>Rating</b>
	<b>say the word to go with the face</b>	<b>Match emotion face to emotion word</b>	<b>Match emotional face to emotional face</b>	<b>match emotional face to emotional voice or story</b>	<b>judge face for intensity or on a scale happy to sad</b>
<b>Hold in mind goal</b>	ü	ü	ü	ü	ü
<b>identify emotion in more than one stimulus</b>	û	ü	ü	ü	ü (target and scale)
<b>identify emotion in more than one modality</b>	û	ü	û	ü	û
<b>employ verbal response</b>	ü	û	û	û	û
<b>make non-categorical judgement</b>	û	û	û	û	ü

**Table 2: Summary of findings in relation to MA-matched groups (From Moore, in press)**

<b>Identification/ Discrimination tasks</b>	<b>MR character- istics</b>	<b>Finding</b> (Where reported mean group MAs are in parenthesis)	<b>Control task</b>
<b>Broscole et al (1986)</b> (Tasks 1 & 3)	children and adults	(6;00) HMR = HNR (5;08*) (4;11) MMR = MNR (5;02*)	Animal identification
<b>Adams &amp; Markham</b> (1991) (Task 1)	primary & high school children	(4.3 to 9.3) MR = NR (5.2 to 7.7) (7.8-12.8) HMR < HNR (7-12.8)	none
<b>McAlpine et al (1992)</b>	children and adults	MR < NR	none
<b>Xerometeriou (1992)</b>	children	(7;08) HMR = HNR (7;09) (5;01) LMR = LNR (4;08)	none
<b>Weisman &amp; Broscole</b> (1994) (Cond 1)	adults	(5;09) MR=NR (5;07)	none
<b>Simon et al (1995)</b>	adults	No comparable MA group	none
<b>Simon et al (1996)</b>	adults	No comparable MA group	none
<b>Rating tasks</b>			
<b>Levy et al (1960)</b>	adults	No comparable MA group	none
<b>Rohajn et al (1995)</b>	adults	MR = NR on emotion faces MR<NR on neutral faces	Rating of Age
<b>Labelling tasks</b>			
<b>Maurer &amp; Newbrough</b> (1987)	adults	No comparable MA group	none
<b>Hobson, Ousten &amp; Lee</b> (1989b)	adults	(7;01) MR= NR (7;0)	labelling of objects and sounds
<b>McAlpine et al (1991)</b>	children and adults	No comparable MA group	none
<b>Moore et al (1997)</b>	adolescents	(7;01) MR=MA (7;02)	labeling of actions
<b>Cross-Modal Matching tasks</b>			
<b>Gray et al (1983)</b>	young adults	No comparable MA group	none
<b>Marcell &amp; Jett (1985)</b>	children and adolescents	(5.7) TMR = NR (5.8) (6.3) EMR < NR (5.8)	none
<b>Hobson, Ousten &amp; Lee</b> (1989a)	adults	(7;01) MR< NR (7;0)	matching objects/actions with sounds
<b>Xeromeritou (1992)</b> (Task 2)	children	(7;08) HMR = HNR (7;09) (5;01) LMR = LNR (4;08)	none
<b>Gumpel &amp; Wilson (1996)</b>	adults	No comparable MA group	none
<b>Simon et al (1996)</b> (Task 3)	adults	No comparable MA group	none
*CA- approximate to MA equivalent			



**Figure 1:Diagram detailing some of the factors involved in determining emotion perception performance of individuals with mental retardation.**

Factors that may determine performance include stimulus validity, secondary pathologies, domain-specific emotion sensitivity, developmental level (MA) and IQ-related language and information processing capacities. Matching for MA does not necessarily control for these last two factors. Consequently any impairment found on an emotion recognition task must be assessed in relation to a control task. If similar performance deficits are found in relation to MA-matched TD children on both an index and control task, then other task related factors are implicated, including IQ-related information processing such as those outlined by Weiss et al (1986). If a deficit is found only on the emotion recognition task it is still not necessarily safe to assume this is caused by a deficit in emotional sensitivity. The index and control tasks may not be equivalent in level of difficulty and/or the emotion recognition task may use stimuli that are not ecologically valid. Finally, secondary pathologies may play a part in determining performance, particularly in older individuals.