CHAPTER 3
DEVELOPMENT OF COMPETENCE-MOTIVATION, PERCEIVED COMPETENCE AND ATTRIBUTIONAL STYLES

In the foregoing chapter theories about adult competence-motivation, perceived competence and attributions were discussed. Although these theories give important information about the 'final stage' of perceived competence, competence-motivation and attributions and the interactions among them, they do not explain how they have developed from infancy. In this chapter theories about their development will be presented. First, however, we will give an overview of the development of the perception of success. Understanding the development of this perception is essential for understanding the development of competence-motivation, perceived competence and attributional style. Competence-motivation can be described as the striving for success. Experiencing success or failure plays an essential role in the perception of competence and control. Finally, the impact of an attribution is dependent upon whether the performance is perceived as a success or as a failure.

3.1 Development of the perception of success

Whether outcomes of behaviour are perceived as a success or a failure depends upon specific characteristics of the outcome, the context in which it occurs and upon development.

According to Heckhausen (1981) perceiving success presupposes that the outcome is perceived as being caused by oneself, as a distinct end term of action and is evaluated against a standard. Newborn babies do not perceive success in this form. Heckhausen (1981) and Veroff (1969) suggest that only after age two or three children are able to perceive outcomes as a success or failure.

Research on the development of contingency perception however, supports the assumption that a very rudimentary kind of success perception already exists very soon after birth. Even eight week old children react in specific ways when they succeed in producing an attractive environmental effect. They smile, coo and repeat behaviour that caused the effect (Watson, 1972; Watson & Ramey, 1972). These reactions did not occur when the effects appeared non-contingent upon the children’s behaviour
(Watson, 1972). This may be seen as an indication that a very simple form of the feeling of personal agency exists already at this age.

Whether obtaining a goal is perceived as a relevant success, depends upon goal characteristics. For children from age two to six, success in independent mastery is especially important (Veroff, 1969). Toddlers for instance strive very persistently to clothe, eat and walk by themselves (Lütkenhaus, 1984).

With development, success is increasingly perceived as reaching a predefined goal. Although even infants may have some predefined goals, during development the motivation to cause any attractive effect is gradually replaced by the motivation to reach a specific goal (Harter, 1985b). Harter (1975) found that four-year-old children were happy with just producing effects, while ten-year-old children tried to detect the rules whereby these effects followed specific behaviour. After reaching this goal, they lost interest in the specific activity.

For many toys and objects, criteria for success are intrinsically given. (For instance puzzles are made to be solved, blocks to build, bicycles to ride on, chairs to climb upon). Whether children really try to reach these successes depends upon the salience of the intrinsic goal and upon environmental influence, for example pressure to use blocks for building a tower instead of using them as a car. In general, reaching goals intrinsic to the task as criterion for success become more important during the first six years of development.

Another type of success that becomes increasingly important is reaching a goal defined by others. During development the number of demands and expectations made by the environment increases rapidly. (Examples include: clothing oneself, eating without making a mess, answering the telephone and school performances). Social approval may be part of the success in these tasks. Six-year-old children rely exclusively upon feedback to define whether an outcome is a success or not. The importance of imposed goals decreases with the development of internal goals and criteria (Harter, 1985b).

Around six years of age success is increasingly defined in terms of social comparison; children strive to be better than someone else (Ruble, 1980; Ruble et al., 1976; Ruble et al., 1980; Damon & Hart, 1982; Spear & Armstrong, 1978). This developmental trend is confirmed by findings concerning the influence of information about peer achievements and direct feedback, which show that the achievements of six-year old
children were more influenced by feedback, whereas older children (ten years) were more influenced by information about peer achievements (Spear & Armstrong, 1978; Stipek & MacIver, 1989). Children between six and eight years still chose the persons with whom they compared their performances in an arbitrary way. Success means 'being better than someone else', regardless of who this 'someone-else' is. They do not yet understand completely the relative influence of experience, ability and effort upon achievement. Only from eight years on do children take age-equality, amount of experience etcetera into account. (Ruble, 1980). They prefer comparison with sex- and age-mates. This comparison takes place mainly in the daily group, often the school-class (Rogers et al., 1978; Rheinberg & Peter, 1982).

With young children (until about three years) success perception is not yet dependent upon task-difficulty or cause of the success. Pre-school children value success regardless of whether the success was caused by luck or by effort and ability. The age at which the incentive value of success starts to vary with task-difficulty is dependent upon the way in which the latter is presented. In optimal circumstances, preference for challenge can be observed in four-year old children (Harter & Zigler, 1974). Task-difficulty defined by way of consistency and distinction information (information about the child’s previous outcomes on the same task, and about performance on familiar tasks) is easier to understand than information based on consensus information (information about the performance of others). The concrete way in which the information is presented is also important (Kuhl, 1987; Heckhausen et al., 1985; Nicholls, 1978).

When task-difficulty influences perceived success, individual differences occur with regard to the level of performance that is perceived to be a success. This is probably dependent upon environmental demands, with higher demands resulting in higher criteria for success.

Rheinberg et al. (1977) and Rheinberg and Peter (1982) found that after the fifth grade (around eleven years) individual norms become important again as a criterion for success. In early adolescence comparison criteria based on a broader context than the classroom become important (Stipek & MacIver, 1989).

Developmental changes also occur in the kind of performances considered to be important. Infants from all cultures are motivated to make
attractive pictures and sounds. Parental reactions (stimulation or not) will however be culturally and individually different from birth on. By giving or withholding acceptance and admiration parents stimulate or inhibit striving to achieve different goals (Valsiner, 1985). Both these socialisation factors together with innate abilities are considered to be responsible for the differentiation in preference for kinds of goals and in evaluation of successes (Deci & Ryan, 1985). Ruble (1980) stresses the role of the school in determining what kind of goals are important for children. Many of the activities of pre-school children are motor-performances, playful or otherwise. With the start of formal education the emphasis probably shifts from motor to cognitive performance.

During development goals become increasingly internalised (Vedder 1987, Harter 1978b, 1980b). This makes children less dependent upon the environment for goal setting and evaluation. In young children, adult evaluation is however the most important criterion for success. In six-year old-children, the perception of success is completely dependent upon this evaluation. Also social comparison is less important as a criterion than positive feedback (Spear & Armstrong, 1978). Ten-year-olds take into account both evaluation and internal criteria in evaluating their performance (Harter, 1978a).

Internalisation of culturally defined goals and criteria for success (or conscious rejection of these goals) is facilitated if the environment is concrete and consistent in defining goals. Consistent feedback on performance also enhances the clearness of the goals (Harter, 1978b, 1980b). If the same behaviour is followed by approval at one time and by disapproval at another, it is difficult to learn what kind of behaviour is expected and to formulate individually chosen goals.

In summary, it can be concluded that even infants perceive success to some extent. In the first six years of life independent mastery-attempts provide the most important sources of success. These mastery attempts are increasingly directed towards goals that are predefined either by the material or by other persons. After the age of six successes based upon social comparison become increasingly important, but only at age eight do children select 'comparable' people for purposes of comparison. After eleven years of age, individual norms again become important. Culture exercises an increasing influence upon goal selection during development. With western children there is a shift from motor to cogni-
tive goals. Internalisation of goals is facilitated if the environment is clear and consistent in description and (dis-)approval of goals. Between four and nine years, task-difficulty starts to influence the perception of success. Optimal influence of task-difficulty is supposed to be present around age twelve, after attainment of full understanding of (a) task-difficulty, defined by information about one’s own performances and that of others, and (b) the relationship between the influence of task-difficulty, competence and effort.

3.2 The development of competence-motivation

As mentioned in chapter 2, recent theories about motivation assume that competence-motivation is innately present (White, 1959, McVicker-Hunt, 1981; Harter, 1978b, 1980b; DeCharms, 1980; Deci, 1980; Deci & Ryan, 1985). This innate competence-motivation amounts to the motivation to bring about desired effects in the environment (White, 1959, Harter, 1978b).

The development of motivation, starting from this effectance motivation until it levels off at for instance an adult’s motivation to write a dissertation, can be divided into several aspects. Harter (1978b) differentiates two kinds of motivation, primary effectance motivation, and the later motivation to reach internally defined goals. Effectance motivation lays the foundation for the latter. Both can be described as the motivation to interact with the environment in an effective way, including the motivation to look for new challenges and to cause effects. The manifestation of motivation is however subject to various developmental changes: development of goals, of processes leading to a situation-specific competence-motivation, of factors that enhance or decrease the motivation, of behaviour resulting from the motivation.


In the first stage, until about seven years, motivation is directed to the development of a sense of autonomous mastery, i.e. the sense of being capable to bring about desired changes in the environment by oneself. He states that achievement motivation evolves from primitive feelings of effectiveness in attempted autonomy. The attempts towards autonomy originate from repeated feelings of mastery.
The earliest form of this motivation can be seen in the reactions to contingent experiences. Children perceiving contingencies react with joy, repeating the behaviour that gave the contingent result. Repeated experience of contingencies results in higher attention to potential new contingencies, higher attention to the relation between behaviour and changes in the environment (Yarrow et al., 1972; Lewis & Goldberg, 1969). Starting at around nine to ten months, children conceptualise a specific goal, and aim to reach that goal. From about eighteen months on, children focus on the outcome, they start to examine their product (Jennings, 1987). From two years on, toddlers strive very persistently to ‘do it themselves’. Motivation in this period is directed towards perceiving oneself as a causal agent. For instance, five-year olds prefer playing with a contingent above a non-contingent reacting machine provided both machines give the same amount of rewards (Weiner, 1979).

There is no consensus about the role of feedback from others in this period. Veroff supposes that positive reactions are not essential, but that negative reactions can be disastrous. Other authors (Harter, 1978b, 1980b; Stipek, 1984) however argue that social approval of mastery attempts is very important, enhancing the feelings of autonomous mastery. In addition, consistent and positive reactions to results help the child to develop internally defined goals (Harter, 1980b). Finally, positive reactions may increase the value of success.

If the perception of mastery occurs only infrequently, children may lose interest in achieving. They have insufficient opportunities to perceive that their behaviour has effects. They are neither motivated to achieve success, nor to avoid failure. However, if children experience that not bringing about desired effects has strong negative consequences they probably develop a strong motivation to avoid failure (for instance negative reactions of others, or reactions that contain the message that failures are indications of stupidity, badness or clumsiness).

Summarising it can be said that the development of competence-motivation in the first seven years of age is primarily dependent upon experience of success in independent mastery. Several authors consider the development of a positive sense of mastery as a prerequisite for the next stage of competence-motivation (Veroff, 1969; Harter, 1985b).

The second stage starts around age six to seven with two major changes. Firstly the behavioural manifestation of motivation changes:
preference for challenging, more difficult tasks and task-persistence become indicative of high motivation. Secondly, the goal of motivation changes: being successful in social comparison becomes important.

This first change is primarily explained by increasing cognitive capacities. Prerequisite for understanding that success at difficult tasks is more rewarding is the understanding that difficult tasks require more ability, and prerequisite for persistence is the understanding that success is related to sustained effort. Both understandings are reached in this period (Nicholls, 1980). Together with the cognitive capacity to process information, the interest in information about one’s own competence increases (Ruble & Flett, 1988). If the relation between difficulty and competence is understood, tasks at the threshold of one’s own competence provide a maximum of information about the latter. Nicholls (unpublished, in Nicholls, 1978) found that children who understand that success at a difficult task is more rewarding than at an easy one, choose an intermediate or difficult task more often than children who lack this understanding. The age at which children understand this depends upon the way in which difficulty is presented. Around age five children are able to relate required competence to tasks in which difficulty is described by referring to comparable or previous task-performances (distinction- and consistency-information respectively). Around nine years children relate required competence to task-difficulty if difficulty is described by information about performances of others (consensus information). The development of understanding the relationship between competence and outcomes has a potential negative side however. It makes it possible to perceive failures as caused by lack of competence. If this lack of competence is perceived to be enduring and non-controllable, it is related to low motivation (Heckhausen et al., 1985), apathy and depression (Weiner, 1979).

The finding that preschool children prefer easy tasks is somewhat strange however. If children were always to prefer easy tasks with 100% chance of success, development would stop. It is likely that this preference is particularly present in experimental situations, where tasks should be performed in a given time, with supervision and evaluation by an (unknown)
adult. Everyday observation of preschool children shows that, although they may repeat a success several times, after some time they select a new, more challenging task. Probably one success is not enough for them to be sure that they have mastered the specific skill. Nicholls (1980) suggests that preschool-children may prefer easy tasks only if normative difficulty cues are used.

The second change in manifestation of motivation concerns the increasing interest in social comparison. By the time competence is seen as a stable and general trait, information about competence relative to others becomes more important. Veroff (1969) states that in this period 'mastery of social comparison' becomes the central theme in achievement motivation. This means that children have to develop enough confidence to ensure that comparing themselves with others is not threatening for their self-esteem. Several authors find a decrease in the level of competence-motivation during the school years (Harter, 1978a; Stipek, 1984). This is attributed to specific factors in the school-situation which are discussed in the next chapter.

In summary, cognitive development in this period results in major changes in behavioural manifestations of competence-motivation. Children look for information about their own competence more eagerly. They compare their performances with those of other children and prefer challenging tasks. As a more general perceived competence develops, it influences competence-motivation. This form of motivation decreases during the school-age.

The development of competence-motivation also turns out to be characterised by the development of the perception of control, and of information processing capacities. Individual development of motivation is closely related to perceived control over results of actions and ideas about the causes of such results. We have seen that perception of mastery or control influences both the development of later perceived competence and competence-motivation. This perception is also important in the development of attributio-nal preferences.

3.3 The development of perceived competence
Perceived competence in its mature form can be described as the whole set of ideas which people have about their own competence at specific fields and skills and about their possibilities for increasing and developing these skills. Overall perceived competence depends upon these specific perceived competences and on the value of skills for the person. This implies that perceived competence is relatively stable and abstract.

Perceived competence as an abstract and stable concept is not yet present in babies and young children. This does not mean however, that young children do not have any competence perception at all. As discussed in section 3.1 infants react in specific ways when their behaviour brings about environmental changes. Experiencing such successes and generalising them into an expectation of capacity to influence the environment can be described as a rudimentary kind of perceived competence. However, it does not necessarily include cognitions. It can be regarded as a simple generalised S-R connection (Lewis & Goldberg, 1969).

Suls and Sanders (1982) distinguish four stages in the development of perceived competence.

The first stage covers the period between birth and three years. Suls and Sanders suppose that the idea of self at this age is not yet related to competence. However, as discussed in the previous section, experiencing successes at this age definitely influences behaviour and affect. Experiences in successfully influencing the environment result in a general perception of possessing the ability to control: success in independent mastery is considered to be especially important for the development of a sense of autonomous mastery (Veroff, 1969). Perceived competence at this age can be seen as a very diffuse concept, which occurs without conscious awareness, of one’s ability to control the environment.

The second stage covers the period from three to six years. At this stage Suls and Sanders (1982) suppose that a concrete notion of ability exists. Children define capacities in terms of concrete tasks ("I can do this puzzle"). Verbalisations of capacities refer mainly to these concrete skills (Van der Meulen, 1987). In general, self-descriptions at this age are supposed to contain mostly physical and few psychological characteristics, but this of course depends heavily upon the definition of psychological self-descriptions at different ages (Damon & Hart, 1982; Hart &
Damon, 1986). Competences are probably not seen as essential characteristics of the self.
It is not clear to what extent task-successes ("I can do this puzzle") are generalised to more general perceived abilities ("I can do puzzles well"). Findings regarding influence of previous performances upon estimations of success, persistence and mood are contradictory (see for instance Schneider, 1984; Unzner & Schneider 1984; Stipek & Hoffmann, 1980; Stipek, 1984; Parsons & Ruble, 1977; Ruble 1980; Rholes et al., 1980). In most stage-two children, cognition is sufficiently developed to allow them to make inferences of ability based upon achievement information (Heckhausen, 1982; Shaklee & Tucker, 1979). The capacity to integrate outcomes on successive performances (Shaklee & Tucker, 1979) and the capacity to differentiate between tasks of different difficulty level (Kuhl, 1987) - which are prerequisites for making such inferences - is present in most five- and six-year-olds. Schneider (1984) and Stipek (1984) found that whether or not information about task-difficulty is used by preschool-children depends upon the way in which task-difficulty is presented. Different ways of presenting might explain the contradictory research results.

Although the cognitive understanding of the concept of ability increases in this period, the concept is probably not a major factor in the perception of the self. Inferences made about competence do not play a salient role in behaviour. For instance, preschool children are capable of differentiating between their own good and bad performances and those of other children, but they do not use this capacity in choosing opponents or in evaluating their own ability (Ruble et al., 1980).

In addition to the perception of ability to control, which is already present in the first stage, more conscious concepts of specific skills emerge in the second stage. Use of information about successes, failures and task-characteristics in developing these concepts is dependent upon the way this information is presented.

The third stage covers the period from six to eight years. Around age six the concept of one’s own ability becomes more abstract and stable (Suls & Sanders, 1982; Heckhausen, 1982; Ruble, 1980). This concept is increasingly based upon information about previous successes and failures: children from six years on have been found to use success and failure experiences in order to make inferences about ability (Ruble, 1980), task difficulty and incentivenss of success (Nicholls, 1978; Parsons & Ruble,
Seriation capability, which emerges in this period, increases the possibility for comparing different outcomes (Weisz & Cameron, 1985). Expectations of success in specific tasks are increasingly based upon perceived amount of knowledge and ability (Otto, 1989). Furthermore, self-evaluations are not exclusively based upon outcomes, but increasingly upon task difficulty and upon strategies used (Otto, 1989). The relation between performance and subsequent estimates of success is less dependent upon situational factors (Schneider, 1984).

Research concerning the perceived competence of children often take six years as lowest age group. Perceived competence at this age can be investigated reasonably well using standard measures (Harter, 1982). The emergence of a more general concept of one’s own competence can be explained by the development of a general capacity to handle abstract concepts. Children at this age understand that an abstract and stable trait can manifest itself in different behavioural ways (Leahy & Shirk, 1985). The way in which successes and failures are processed is still primitive however. Silon and Harter (1985) found that perceived competence of six- to eight-year old children consists of only one factor. After eight years they found several factors, corresponding with different competence fields. Thus it seems that younger children do not yet classify different skills into broader competence fields. The presence of one general factor indicates however that perceived competence at this age is not merely an incoherent collection of perceived skills.

Children in this stage do not yet understand that capacity and effort can compensate each other, although they understand that both high capacity and high effort increase performance. (Heckhausen, 1982). During this period, perceived competence develops as an abstract and stable construct based upon prior success and failure. The connection between this perceived competence and the more basic perceived control is not clear. It can be assumed that perceived control influences the interpretation of success and failures.

The fourth stage covers the period from about nine years until adulthood. This last stage is characterised by the increasing capacity to process and weigh information in developing a concept of one’s own competence (Suls & Sanders, 1982), resulting in an increasing correlation with actual competence (Nicholls, 1978; Suls & Sanders, 1982; Harter, 1985b). Around age eleven most children use information in a very similar fashion to adults (Heckhausen, 1982; Suls & Sanders, 1982; Damon &
Hart, 1982). They take account of the difficulty of the task, experience and characteristics of the person with whom they compare themselves, the presence of facilitating or disturbing factors, etcetera. In this period ability is increasingly perceived as a stable trait (Ruble & Flett, 1988). The stability of perceived competence also increases with age (Leahy & Shirk, 1985). Self-descriptions in this stage contain mainly abstract, psychological concepts (Damon & Hart, 1982). The importance of the direct social context wanes, different characteristics are united by their contribution to the self’s personal, moral and philosophical belief systems (Hart & Damon, 1986).

When children differentiate between factors which influence performance, the attribution that is given influences the impact of a performance upon perceived competence. A performance attributed to luck or task easiness makes less impact than a performance attributed to competence (Weiner & Heckhausen, 1972; Meyer, 1973).

In this last stage the processing of information develops into a mature form. Children acquire the cognitive capacities to process information about performance and different contributing causes in the same way as adults. This results in a more realistic perceived competence.

In this stage the influence of the earlier basic feeling of competence and capacity to control may be found in preferred attribution patterns and perceived control over outcomes.

It is not clear why Suls and Sanders (1982) suppose that the whole period between nine and adulthood can be seen as one stage. After the age of nine also several qualitative changes occur. For instance, ten-year-old children tolerate inconsistencies in different parts of their self-concept, while children around fifteen years aim for an internally consistent self-concept (Damon & Hart, 1982; Harter, 1985b). In addition, the role of social comparison in perceiving one’s own competence makes way for an integration of autonomous and social norms (Veroff, 1969; Rheinberg & Peter, 1982). Because this age-group is beyond the scope of this book, we will not discuss it in detail.

Suls and Sanders’ developmental theory focuses upon the structural development of perceived competence. Other authors have investigated the development of the level of perceived competence. Estimation of success is unrealistically high in young children, and decreases to more realistic expectations with age (Schneider, 1984; Parsons & Ruble, 1978; Stipek et al., 1984). The pattern with younger
children may be caused by a lack of differentiation between hope and expectation (Stipek, 1984). In children between eight and thirteen Harter (1981) found no developmental differences in mean scores on the scale for perceived competence.

When all findings are combined, it may be concluded that perceived competence in preschool-children can be seen as a perceived ability to control and succeed in influencing the environment. Their perception of skill-related competences is limited to competence perceptions of concrete tasks.

In the period between six and eight years skill-related perceived competence becomes more differentiated. Children at this age can and do use information about their own performance and start to relate this to task-characteristics in order to estimate their chances of success and competence more adequately. They are not yet capable however of taking different factors into account together. They do not yet classify skills in broader fields.

Perceived competence at this age has still little correlation with actual competence (Suls & Sanders, 1982). This correlation, and stability of perceived competence increase rapidly between eight and twelve years of age, as a consequence of the increasing capacity to process information.

In the development of perceived competence two lines can be distinguished. First there appears to be a basic construct, developing in very early childhood, consisting of underlying ideas about the possibility of controlling and influencing the environment. Secondly there is the development of cognitive capacities for processing information about tasks and the performance of self and others. In later stages basic perceived control may influence the way in which information about one’s own competence is processed. This may be one of the causes of the large differences in perceived competence which are found between people who have comparable actual competence.

This basic construct is assumed to influence not only perceived competence, but also to be important in the development of attributional styles.

3.4 The development of attributional styles
As seen in the previous chapter, attributions made by adults is the result of a complex cognitive process. Young children do not yet possess the necessary cognitive capacities needed to do this. However, even infants perceive causal relationships to some extent. DeCharms (1968) states that the causal concept appears very early in childhood, coming from the universal experience of being a cause. Infants differentiate between contingent and non-contingent relations. This is probably a purely perceptual process in which central i.e. cognitive information-processing takes no part. Leslie (1986) supposes that perceptual processing in infants takes place in isolated modules, in which the incoming information is processed according to strict innate rules. For instance, two events shortly following each other may be interpreted by these rules as causally related. This perceived causality is sent to the central information processing system and is tested there. Contrary to the processing in the modules this central processing is dependent upon the knowledge and experience which is present, and upon the developmental level. New information is tested against the information present. This could mean that very young children do perceive causal relationships at a modular level only, i.e. do not arrive at a cognitive representation. Each perceived causal relationship is stored and contributes to the knowledge that is used in later central processing. In this way children develop a notion about the possibility of causing changes in the environment, i.e. develop cognitive rules that are used to test whether perceived causal relationships are really causal. It can be assumed that rather early in development central processing also starts to play a part. This processing is probably rather primitive in early childhood, as may be indicated for instance by the finding that children under age seven do not recognise the non-contingency of chance-games (Weisz & Cameron, 1985).

During development processing rules become more complex and differentiated. The frequency of perceived causalities may influence these rules. More frequent perceptions of causal relations strengthen the rules that confirm the existence of causal relationships and in this way influence attributional preferences. Ideas about causal relations may change of course, as a result of new experiences and new cognitive capacities.

Cognitive theories about the development of attributions focus upon the structural development of the rules used in central processing and less upon individual differences in the contents of these rules.
Ascribing an outcome of action to a specific cause is possible only if the capacity is acquired to differentiate between an outcome and its causes. Nicholls (1978) investigated the kind of ability judgement children made based upon information about effort and results of different pairs of children. He concludes that differentiation between result and different causes develops in four stages.

In the first stage he found no discrimination between result, amount of effort and ability (five-six years). Success means good effort means good competence. Ruble and Rholes (1981) found that six-year olds do not use information about characteristics of a person to predict future behaviour. Heckhausen (1982) however found that children from five-six years on are able to predict outcomes based upon information about differences in effort or differences in ability, provided only one causal factor is taken into account. This implies that some notion about the causal influence of ability and effort is present at this age. The differences between the two sets of results may stem from differences in operationalisation of the concept of difficulty. Heckhausen used simpler operationalisations.

In the second stage, age seven to nine, children clearly understand that both effort and ability can influence result. They do not see however that these two can compensate each other. Perceiving effort and capacity as compensating need not be a developmental phenomenon however. Nicholls (1984) argues that in daily life effort and capacity are positively related; people who expend more effort are often more competent. The compensating relation is manifest mainly in schooltasks, if social comparison is used as criterion. Rholes et al. (1980) found that until about eight children tend to see either both effort and ability or neither as responsible for failure. They argue that this attribution tendency makes young children less prone to the negative effects upon motivation of attributing failure to lack of competence.

In the third stage, at age ten to eleven, children show inconsistent understanding of the way effort and ability can be interactive causes of a performance. Again, whether this understanding is detected or not may be heavily dependent upon how ability is operationalised. According to Heckhausen (1982), by age seven to nine children start to understand that effort can compensate for differences in ability, provided that the outcomes are equal. At this age children also start to differentiate compet-
ence in different fields. This may result in field-dependent attributional preferences.

In the fourth stage (from twelve years on) children completely understand the interaction of effort and ability. Around ten-twelve years the capacity to attribute and understanding of the compensation relationship between effort and ability closely resembles those of an adult (Heckhausen, 1982; Suls & Sanders, 1982). From grade 5 on attributing failure to incompetence is negatively related to persistence, subsequent performances and mood (Dweck & Reppucci, 1973; Rholes et al., 1980). Differential affective consequences of different attributions appear around age ten. At this age attribution to ability produces more affective reactions than other attributions. Children of this age apply the rules of logic to determine the influence of different factors upon performances (Weisz & Stipek, 1982). Because of the increase in information processing capacity and the differentiation of attributions in specific domains attributions become increasingly realistic in this stage. Complete capacity to weigh and integrate information about different influences is possible only if the child has reached the formal operational stage of cognitive development.

The above description of the development of attributions focuses upon attributions in an 'adult way' and upon the use of specific attributions such as are used by adults. As Weiner (1986) pointed out, the enormous range of possible causes for events can be categorised by three dimensions: internal-external, stable-variable, controllable-non-controllable. Ruble and Rholes (1981) argue that Weiner’s categorisation may not be useful for children. Children make less sharp distinctions between the self and the other; moreover, they are less likely to perceive themselves and others in terms of stable traits. They are less inclined to predict that new behaviour will correspond with preceding behaviour (Ruble & Rholes, 1981). This does not mean however that the dimensions themselves are useless, but mainly that they cannot be interpreted in the same way, and that the connections between concrete attributions and underlying dimensions may be different. There is some evidence that even pre-school children differentiate between the poles of these dimensions before they are able to use the concepts of causes as adults do. They may have ideas in the sense of: "it is caused by me, or by something outside me". "I can (not) influence this outcome". "It is caused by something that will (not) be there next time". Several findings (Weiner, 1986; Graham et al., 1984)
suggest that six-year-olds discriminate between the different type of causes: successes caused by something 'in themselves' are accompanied by pride, while successes caused by something 'outside themselves' are not; they relate feelings of pity with failure due to uncontrollable factors and anger with failure due to controllable factors. As argued in the beginning of this chapter, even infants may discriminate between controllable and non-controllable to some extent.

In addition to research on the cognitive capacity to attribute in increasingly complex ways, other research has focused upon the development of preferences for specific types of attributions. The main questions in this research are whether internal attributions and perceived control increase or decrease with age. On theoretical grounds, both an increase and a decrease of internal attributions can be defended. Developmental studies suggest that young children have a feeling of omnipotence (Piaget, 1930). They think their wishes can influence things like weather, death and illnesses etcetera. They tend to overrate personal influence (Weisz & Stipek, 1982). Preschool children base their predictions of success at a chance game upon age, competence and experience, and also attribute outcomes to these causes. The finding that this tendency declines with age can be explained by Leslie’s modular scheme. If the occurrence of intention and an arbitrary event fulfil the conditions of perceptual causality, they are cognitively interpreted as causal. As yet, there is no information (from experience or culture) that thoughts cannot influence events. Thus it can be assumed that internal attributions based upon contingency should decrease with age. On the other hand, capacities to control the environment increase proportionally with the increase in actual competence. This should result in an increase of internal attributions with age. Weisz and Stipek (1982) investigate which of these opposite tendencies actually occurs, by reviewing investigations regarding the development of direction (internal versus external) of the locus of control. They summarise 33 studies, in which 12 different scales have been used. The results of these studies are inconsistent, no general tendency could be found. This is probably due to the incomparability of the instruments and the operationalisation of dependent variables and content and to defects in the instruments.

In addition to the development of the perception of control, several other developmental tendencies in specific attributions have been investigated. Harter (1985b) found that between eight and fourteen years the
'beneffectance-tendency' develops. This is the tendency to ascribe success more than failure to internal factors (Heckhausen et al., 1985). This tendency is interpreted by some authors as being a protection of the self-esteem.

Another developmental trend is the decrease between age eight and twelve in saying that one does not know what caused the performance. In this period expressing ignorance of what caused the performance correlates more strongly than any other attribution with low perceived competence. Not knowing what led to the results of actions may be a sign of a feeling of helplessness in influencing the environment (Harter, 1980b). The meaning of different attributions may also be influenced by development. For instance, Weiner (1971) assumed competence to be a stable attribution. Young children do not perceive competence as a stable characteristic, even if they use words that adults use in this particular sense.

Adequate comprehension of the development of attributions is possible only if the development of reasoning and cognition is taken into account.

In summary; we found that even infants perceive causal connections between their own behaviour and consequences. The concept of perceived control can be applied adequately to pre-school children. Not much is known however about the specific perceptions of children under eight years with regard to causes of events and consequences of these causes. In general, children appear to interpret causes of outcomes in terms of internal-external and controllable-uncontrollable. It is clear that a good understanding of cognitive development and the kind of logic and reasoning children use is a condition for understanding attribution processes. Attributional processes of the kind that exist in adults seem to develop only around age eight. Between ages eight and twelve, information processing capacity increases rapidly and with this the capacity to attribute in a realistic and differentiated way.

3.5 General Conclusions

The development of perceived competence, competence-motivation and attributions appears to be strongly determined by and based upon the development of perceived control.
Perceived control—or perceived mastery, which we consider synonymous with perceived control—is assumed to play a major role in learning and development (Watson & Ramey, 1972; Finkelsteyn & Ramey, 1977; Lewis & Goldberg, 1969; Yarrow et al., 1972; Weisz & Stipek, 1982). It is considered an important factor in the development of several kinds of psychological problems, such as depression (Abramson, 1978; Dweck, 1975; Weisz & Stipek, 1982).

Until about six years there is probably no general perceived competence or attributional preference. The sense of mastery in this stage can be seen as only a rudimentary manifestation of both variables. Competence-motivation is presumed to exist before age six, and interpreted as the motivation to succeed in autonomous mastery.

A change occurs around age six to eight. In this period children start to develop a perceived competence based upon the integration of past experiences, which probably results from a rapid increase in information processing capacity. At the same age socially defined goals become important. Processing information in this particular field is still rather primitive however, being restricted to simple one-to-one relationships.

Around age ten to twelve a second shift takes place, as children start to attribute achievements to causes in an adult-like way. At this age understanding of compensating schemes develops. In the years which follow children refine their information processing until around age twelve there is no essential difference from the way adults process information. These shifts have far-reaching consequences for how factors like success-rate and relative competence influence perceived competence, competence-motivation and attributions.

It seems that the answer to ‘the chicken-egg’ questions in the preceding chapter should be: "Neither comes first. Both perceived competence and attributional preferences are preceded by the perception of control". This perception of control is essentially the same as what is called ‘effectance’ by White, ‘self-efficacy’ by Bandura, self-determination by Deci and ‘power’ by Epstein (Harter, 1978b; Deci, 1980).

The general outline of development discussed here, does not account for the large individual differences in perceived competence, competence-motivation and attribution preferences. Various factors both inside and outside the individual influence their development. Often this occurs via perceived control or capacity to process information about one’s own performances, or both. These factors are discussed in the next chapter.