Children's Understanding of Traits as Causal Mechanisms Based on Desires

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Abstract

Two experiments investigated the bases on which children predict behavior and emotion from trait information. In Experiment 1, with 4-7 year-olds and adults, children from 5 years made different emotion predictions about the same situation for actors with different traits, showing an understanding that traits can be causal mechanisms, rather than mere summaries of behavioral regularities. There were age differences in strategies for behavior prediction: 4-year-olds used a situation-matching rule but older children saw traits as generalisable across situations. While 6-7 year-olds endoresed predictions of dissimilar behavior with the same valence as the given trait information, cues, they also recognised that inferences based on value were less certain than those based on semantic similarity. Experiment 2 showed that accurate emotion predictions by 3- to 7-year-olds were linked to understanding desire as a subjective mental property. Differences in understanding specific traits show that trait understanding is underpinned both by general conceptual change in desire understanding and by knowledge about specific traits.

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Children's Understanding of Traits as Causal Mechanisms Based on Desires

Many years of research into children's understanding and use of trait terms have led to the conclusion that children rarely use such terms spontaneously when describing people until around 6-9 years (e.g. Livesley & Bromley, 1973; Ruble, Newman, Rholes & Altshuler, 1988) and that preschoolers do not understand the concept of a trait as a stable, enduring cause of behavior (see Miller & Aloise, 1989, for a review). Much of the early literature concentrated on the question of whether or not children at a particular age 'understand traits'. However, researchers increasingly acknowledge that the appropriate use of trait terms involves several different conceptual skills and that these may develop at different periods.

Previous literature provides some clues about the kinds of age-related changes that occur in children's conceptions of the nature of traits. Even preschoolers behave differentially to different targets (e.g. Krasnor, 1982), suggesting that they form specific expectations depending on the identity of an interactant, while Eder (1989) has shown that from 3-4 years of age, children are sensitive to the difference between specific questions about single actions and general questions about habitual behavior. Many studies, such as that of Berndt and Heller (1985; Heller & Berndt, 1981), show that children of around 5-6 years of age can predict future behavior from trait information. For example, children told that a story character had shared their lunch on two different days rated the character as more likely to share with and to help another child than a selfish character, and rated the generous actor as more 'sharing' and nicer than a selfish actor. However, this ability was limited: it was only from the age of 8 that children made significantly different predictions between one of the actors and a control condition (where they were only given information about a character's age and sex), and then only for the selfish actor. These limitations raise the question of whether children need a conception of traits in order to make such predictions, or whether simpler alternative strategies might be used. For example, children may just be using their vocabulary knowledge to predict similar future behavior, or might predict what they themselves would do in the situation, or may give the socially desirable reaction (e.g. Gnepp & Chilamkurti, 1988).

Analysis of the concept of a trait suggests different criteria that children may adopt when attributing traits. The most fundamental distinction is between what Yuill (1992a) terms *behavioral regularity* and *causal mechanism* views. The first type of conception merely acts as an 'inference ticket' (Ryle, 1949), allowing an attributor to infer that someone with a trait x will behave in certain ways under certain conditions. This conception of traits permits inferences about stability and cross-situational consistency. The second type implies that behavioral regularity is *caused* by some property of the person. For example, Yuill suggests that traits may be thought of as 'comparatively stable states of mind that generate desires and beliefs' (ibid., p. 270). Only this conception of traits permits inferences about causality. The vast majority of studies address the first type of conception, dealing with behavioral prediction, but very little attention has been given to the causal view, perhaps because it has not been clear how to test this view.

The question of when children become able to use a causal view is given a new theoretical importance by recent research in theory of mind, and the two central concepts of belief and desire (see e.g. Perner, 1991; Wellman, 1990). Work on the development of trait understanding has lacked a strong underpinning theoretical framework, and theory of mind could provide this. Understanding desire seems particularly important as a prerequisite for understanding traits for the following reason: traits provide a rationale for why differences in desires occur, so the perceived need to use traits as explanatory devices will not arise until children understand that such differences in desire exist.

Previous work suggests that understanding of desires begins to emerge at around the age of 2, but continues to become more sophisticated during the preschool years. For example, Wellman and Woolley (1990) showed that 2-year-olds can predict a person's action on the basis of a desire, and Yuill (1984) found that 3-year-olds can predict that given a fixed outcome, a character who wanted it will feel happy while a character who wanted something different will feel sad. These predictions about emotions could be based on a relatively simple view of desires as transitory preferences (e.g. children may label a neutral goal as temporarily desirable if they are told that a character wants to achieve it: see Perner, 1991). However, when a goal has a strong intrinsic value for the child (e.g. if it is inherently bad), merely saying that a character wanted that goal cannot make it desirable. For example, Yuill, Perner, Pearson, Peerbhoy and van den Ende (1995) showed that given an actor who wants an apparently undesirable goal (hitting another child with a ball), children of 4-5 judge the actor pleased on attaining the goal, because they understand that he achieved what he wanted, even though it was undesirable. This stance is termed 'subjective desirability'. Younger children can only judge the actor's emotion on the basis of the objective value of the outcome, a stance termed 'objective desirability'.

To have a causal understanding of traits, we need to see that some people will react very differently from ourselves because they have different desires. Thus, an honest person will be horrified at a suggestion to keep a lost wallet while a dishonest person will not be concerned at such a prospect. Whichever of these reactions we feel ourselves, we need to understand that someone with different personality characteristics will feel differently. Children should not have an understanding of the causal nature of traits until they understand desirability as a subjective property, at about 4-5 years: it is only then that they can understand that different people could have different emotional reactions to the same situation, regardless of the value of that situation, and thus can make what Gnepp and Gould (1985) call 'personalised inferences'.

The present paper examines the understanding of traits as causal in relation to children's developing understanding of desirability. Experiment 1 addresses the issue of how best to assess children's causal understanding of traits, and whether such an ability develops at around the same time that children develop an understanding of desirability as subjective. This study also investigates the different bases on which children might attribute traits. In Experiment 2, we use the method of the first experiment to relate the causal conception of traits directly to children's conceptions of desirability.

Experiment 1

One method of assessing children's understanding of traits as causal is suggested by Gnepp and Chilamkurti (1988). They argued that the idea of traits as internal states causing behavior can be demonstrated by the ability to predict individual differences in emotional reactions to an event. For example, being chosen for the lead part in a play may produce elation in an outgoing child, but dread in a shy child. They asked children and adults to predict emotional or behavioral reactions of story characters when information about previous behavior was either present or absent. Kindergartners were influenced by trait information in predicting behavior and emotion, but this tendency was rather weak until the age of about ten. The authors concluded that 'only the college students, and to a lesser extent, the fourth-graders demonstrated a clear understanding that personality attributions based on past behavior have implications for emotional reactions to future events' (ibid., p751).

There are two aspects of Gnepp and Chilamkurti's conclusions about children's causal understanding of traits that require further investigation, one involving the analysis and one the method. First, the authors did not report the absolute levels of performance against each age (i.e. comparing performance against chance expectancy). As the authors said, children did make more appropriate predictions of emotion with age, but it is not entirely clear whether they understood the principle of traits as internal causal factors: although 6-year-olds showed a significant difference between predictions of emotion in stories with or without prior trait information, their predictions do not seem to be different from chance (average score was about 40% for binary choices), and neither do those of the 8-year-olds. The present study investigates whether young children could perform better than chance when inferring emotions from trait information.

Second, Gnepp and Chilamkurti used a relatively indirect method of investigating emotion predictions: comparing children's emotion predictions either with or without information about a character's previous behavior. A more direct test of children's causal understanding of traits is to compare predictions of emotion to the same event for characters with opposing traits. The apparently poor performance of young children in the study by Gnepp and Chilamkurti may have occurred because the contrast between stories with trait information and those without did not yield a sharp enough distinction between predictions. Using our more direct test, children will in all cases have information on which to base a prediction. Children who made correct emotion predictions for the *opposing pair* of traits would clearly demonstrate an understanding of the causal force of traits in producing idiosyncratic emotional reactions, since they could not be relying on predictions that would not differentiate the pair, such as situational demands, their own preference or social desirability information.

Before children have a causal understanding of traits, they would be unable to make appropriately differentiated predictions of emotion in such situations. They might, however, be able to predict *behavior,* using one of several simple rules. Some but not all of these rules would allow correct behavior predictions about opposing traits. For example, predicting on the basis of one's own likely behavior or of what is socially desirable would give correct predictions for only one trait of a pair. A useful analysis of different criteria or rules that children might use for forming expectations of behavior is set out by Rholes, Newman and Ruble (1990). The simplest rule, they argue, is *situation-matching:* 'matching the situation in which behavior is observed to the situational context' of the behavior to be predicted (ibid., p. 379). A second type of rule is *valence-based:* for example, if someone is observed to show positively-valued behavior of one type, they will be expected to show other forms of positive behavior. Thirdly, children might use the *conceptual similarity* of different behaviors. Thus, if two behaviors are labelled 'helpful', then someone who performs one would be expected to perform the other. Finally, children might make use of the causal nature of traits, as expressed in the *causal mechanism* view of traits mentioned above.

Correct behavior predictions, then, might be generated by situation-matching, valence or conceptual similarity, as well as by a causal view of traits. There is evidence that children may use some such rules: for instance, young children seem to base impressions on overall valence of traits. Saltz and Medow (1971) described how children of 5-8 years often did not acknowledge the coexistence of good and bad features in a single person (e.g. a liar cannot also be a good baseball player), but were much more likely to accept the coexistence of two good features (e.g. a mother can also be a good sales-clerk). But it is hard to distinguish empirically between each of the prediction rules. For example, in the situation-matching rule, are situations matched on the basis of some kind of superficial similarity in their *description,* or because of a recognition of underlying *conceptual* similarity? Rotenberg (1982) cautions that understanding dispositions should not be reduced to the question of whether children can use the vocabulary items in a superficially appropriate way, but this might be all that is required in the conceptual similarity view. This caution raises the vexed issue of how (and whether) to distinguish between knowledge of language and of concepts. In the conceptual similarity rule, children might use some rather simple semantic match to judge whether the observed and predicted behaviors are both linked to the same trait label. For the present, we can say that situation-matching and conceptual similarity might both rest on a rather superficial similarity between the descriptions of the original behavior and that to be predicted.

'Similarity' also begs the difficult question of the criteria by which such similarity is judged: it could be judged, for example, by whether the target of the given behavior and that to be predicted is identical or similar in social role, whether both events occurred on a sunny day, whether the actor was wearing red... and so on. Recent debaters in implicit personality theory have considered whether even the links that adults make between traits are 'mere' semantic overlap or linguistic convention (Semin, 1990). De Soto, Hamilton and Taylor (1985) present evidence that this is not the case: in a memory task, students tended to make confusions between descriptive terms that were consistent with trait-inference patterns when the terms were linked with people's names, but not when they were linked with nonsense words.

Whatever the answer to these thorny issues about judging similarity, it is all the same possible to test a general similarity position. If children take this approach, they should predict an actor's future behaviors to the extent that those behaviors are like (in some intuitive sense) previous behavior. We addressed this position in the present experiment by asking children to make predictions from previous behavior to future behavior that varied in similarity to the original behavior. For example, given a boy who dishonestly blames his younger sibling for a mess he himself has made (original behavior), it is fairly safe to predict that he would blame a peer if he himself broke a glass (similar, or 'near' behavior), but less certain that he would steal some flowers from a neighbor's garden (less similar, or 'far' behavior).

The assessment of whether children use a valence-based strategy is not as clearly distinguishable from a descriptive similarity or a trait position as might first appear. Children might endorse the far-behavior prediction either because they see the relation to an underlying trait or purely because they expect someone who is bad in one respect to be bad in all respects. We tested this possibility by including a *red-herring* prediction that tapped a different trait of the same value. A valence-based strategy would lead to children endorsing any behavior of the same value as the previous behavior, even if it was dissimilar. For example, would one clearly expect the dishonest boy in the above example to be selfish? What would he do if he found his brother wearing one of his scarves? Use of a simple valence strategy would lead to a prediction of selfish behavior, even though there is no clear or necessary reason why a dishonest person might also be selfish.

Of course, even adults show evidence of halo effects (Thorndike, 1920), although they may acknowledge if asked that such a story character may not be all bad. In order to distinguish a simple valence-based strategy from a more considered response, we asked subjects to rate the confidence with which they made different predictions. For a valence-based strategy, children using a simple valence rule should be equally confident of predicting near, far and red-herring behaviors of the same valence as the original behavior. A more considered strategy would produce firmer predictions for similar (near) than dissimilar (far and red-herring) behaviors.

In summary, the present study investigated the bases for trait attribution in children as compared with adults. Children from the age of 4 were tested, because we expected that a purely behavioral conception of traits emerges very early, but the bases on which predictions are made would become more sophisticated with age. Furthermore, we expect a causal view of traits to be evident somewhere between the ages of 4 and 7. The experiment was designed to assess (1) whether children can make correct behavior predictions from trait information, (2) when children can use a causal conception of traits, as shown by the ability to predict emotional reactions for opposing trait pairs, (3) whether children use a simple similarity heuristic, endorsing near but not far behaviors, or alternatively, make predictions consistent with a more broad-based understanding of a trait concept, endorsing far behaviors as well as near ones, and (4) whether children show any evidence of a valence-based strategy, by endorsing red-herring questions.

Method

Subjects

We tested ten 4-year-olds (mean age 4;7, range 4;0 to 4;11, 8 girls), 18 5-year-olds (mean age = 5;6, range 5;0 to 5;10, 9 girls), 18 6-year-olds (mean age = 6;7, range 6;0 to 6;11, 11 girls) and 18 7-year-olds (mean age = 7;3, range 7;0 to 7;11, 9 girls). Twenty-two adults (1st year undergraduate psychology students, 15 women) were given a written version of the children's tasks.

Design

Each child heard 16 stories describing 8 contrasting pairs of traits, and had to answer 5 questions about each trait. The questions tapped (a) knowledge of the trait term (trait question), (b) inference to similar behavior (near-behavior question), (c) inference to less similar behavior (far-behavior question), (d) inference of emotion and (e) inference to different traits of the same value (red-herring question). Near-behavior situations varied only in minor details from the original behavior (e.g. the target – a sibling vs a peer, or the object – spilt food vs a broken glass – might be varied) while far-behavior situations involved the same general trait in a different manifestation, e.g. if the original behavior was falsely blaming another for one's own misdeeds, the far behavior might involve stealing flowers: both dishonest, but one involving lying and the other stealing. The questions were piloted on a small sample of adults to ensure that the appropriate inferences could be made, and the results for the adults (see below) support our manipulations of near, far and red-herring questions.

Materials

The trait pairs used were: selfish – generous, cheerful – miserable, honest – dishonest, lazy – energetic, show-off – shy, timid – brave, careless – fussy and clever – stupid. An example story pair and questions are shown in Table 1, together with a summary of the trait terms and predictions for the other story-pairs. For the children, each story was accompanied by seven colored pictures depicting the two trait-consistent past behaviors and the five new situations with the alternative response choices.

Table 1 about here

Procedure

Two sets of traits were compiled, each set incorporating one member of each trait pair, and children were tested on the two sets in separate sessions. The traits in the first set were presented in a different randomised order for each child, and the opposite traits in the second set were presented in the same random order for that child. The questions were asked in a fixed order, as shown in Table 1.

After each response, the child was asked to make a confidence rating in the following way: after a given answer, s/he was asked: Are you very sure, quite sure, or not very sure? On each question, the child was also given a 'can't tell' option. The child thus made a binary choice (picking one of two responses) and then a 3-point rating of certainty (or a 'can't tell' response). Although the red-herring question did not have a 'correct' answer, for present purposes the same-valence choice was scored as correct. Children were shown how to use their hands to indicate their level of confidence: the wider apart, the more sure. Children quickly picked up how to do this and extensive pre-training was not necessary.

Children were tested individually in a quiet room by a female experimenter. A minority of the youngest children who became tired or distracted needed more than two testing sessions, while adults filled in questionnaires in groups, in a single session.

Results

The results are dealt with in three different ways. We first examine whether children's binary choices on the different tasks show performance at higher than chance levels, since we were interested in the ages at which children can reliably make the relevant predictions. We then perform selected ANOVAs to assess specific hypotheses about the relative difficulty of different questions and to assess whether subjects became more reliable with age in making various predictions. Finally, we analyse the confidence ratings to examine hypotheses about the different strategies children might use in attributing traits.

Performance on Alternative Forced Choice Questions

We can assess the different possible criteria for predicting from traits by comparing performance (binary choice) on the different questions against chance (binomial distribution, with p at .01 unless specified otherwise). In the majority of these analyses, we look at the total number of trait *pairs* correct out of 8 at each age, as a stringent test, although in most cases the same results were obtained when considering the more lenient criterion of number of individual traits correct out of 16.

1. Judgement of trait labels

All age groups answered the trait recognition question significantly above chance for the trait pairs overall, though for 4-year-olds this was significant only at $p<.05$, and the general level of performance was not high, as shown in Figure 1. Older children and adults unsurprisingly scored more correct than younger children: an ANOVA on the number of correct pairs at each age showed a significant main effect of age, $F\ (1,4) = 7.3$, $p<.001$, and planned comparisons showed that 4-year-olds scored significantly lower than the other age-groups combined, who did not differ significantly from each other.

2. Near and far behavior

All age-groups from the age of 5 made correct near- and far-behavior predictions beyond chance levels, as shown in Figure 1. The 4-year-olds performed no better than chance on these questions for the set of traits as a whole, although they performed above chance on the near-behavior prediction for one trait pair, honest – dishonest. An ANOVA for the number of correct pairs of near and far predictions at each age showed a main effect of question type, $F\ (1,81) = 37.1$, $p<.001$, with more correct pairs for near than far predictions. As expected, there was also a significant main effect of age, $F\ (1,81) = 9.23$, $p<.001$, as 4-year-olds did more poorly on both questions than the other age-groups. There was no interaction between age and question type, F<1.

Figure 1 about here: available in hard copy only

3. Judgement of emotions

All age groups except the 4-year-olds made more correct emotion judgements than would be expected by chance. The mean number of pairs correct at each age are shown in Figure 1. A one-way ANOVA showed a main effect of age, $F(4,79) = 8.68$, $p<.001$, with planned comparisons (p set at $<.01$) showing 4-year-olds scoring lower than any other age group and 5- and 6-year-olds lower than the 7-year-olds and adults. This question was generally harder than the behavior questions, as might be expected if a causal understanding of traits develops later than a behavioral conception. The most stringent test of this idea is the comparison of emotion and far-behavior questions, since the latter is the harder of the two behavior questions. An ANOVA on the number of correct pairs with age and question type (emotion and far behavior) as factors showed a main effect of question type, $F(1,81) = 15.84$, $p<.001$, as well as the expected main effect of age, $F(1,81) = 10.03$, $p<.001$. The interaction of the two factors was not significant, $F(4, 81) = 2.02$, $p<.10$, but inspection of the means shows that the difference between question types was minimal for the 4-year-olds (unsurprisingly, since they performed below chance on both these questions anyway) and for 7-year-olds, who showed almost identical mean scores on the two questions, apparently because they did unexpectedly poorly on the far-behavior question. Planned comparisons with p set at $<.01$ showed that the differences between the emotion and far-behavior scores were significant for 5- and 6-year-olds and for adults.

4. Red-herring questions

There was no 'correct' answer to this question, which asked for a prediction to behavior that was unrelated in meaning to the relevant trait but was of the same value. We analysed the data scoring the same-value prediction as correct. Binomial tests showed that only the 6- and 7-year-olds endorsed this question at beyond chance levels (the latter at $p<.05$). An ANOVA with age and question type as factors showed a main effect of age, $F(4,79) = 5.79$, $p<.001$, and planned comparisons ($p<.01$) showed that the 6- and 7-year-olds scored significantly higher than the other groups combined, as shown in Figure 1. Analysis of the confidence ratings (below) throws further light on this pattern of results.

Confidence ratings

Examining the confidence ratings helps to assess whether, despite picking the correct choice above chance levels, subjects saw some of the predictions as more certain than others. The mean confidence ratings for each question are shown in Figure 2.

We first looked at the relative confidence in predictions of trait and near behaviors, scoring incorrect answers or 'don't know' as 0, and correct answers as 1,2 or 3 in order of increasing certainty. We excluded the youngest group, who performed below chance on the near-behavior question. There was a main effect of question type, $F(1, 72) = 6.46$, $p<.01$, with less confidence expressed in the near-behavior than in the trait question, as expected. There was no effect of age, $F<1$, and no interaction of age and question type, $F<1.5$. An ANOVA on the far-behavior and emotion questions (again excluding the youngest group) shows a similar picture, with a main effect for question type, $F(1, 72) = 15.39$, $p<.001$ and no effect for age, $F<1$ or interaction of age and question type, $F(3, 72) = 2.07$, $p<.12$. Children and adults were more confident of far-behavior than emotion predictions.

The confidence data can also provide some validation of the distinction between near and far situations: if the stories were interpreted as we intended, subjects should make accurate but less confident predictions for far than near behaviors. We therefore carried out an ANOVA on the confidence ratings for near and far questions. The youngest group was excluded because their performance was below chance on these questions. There was a main effect of question type, $F(1, 72) = 33.19$, $p<.0001$, with higher confidence ratings for near than far predictions. There was no effect of age and no interaction of age and question type, Fs <1.

Figure 2 about here: available in hard copy only

The confidence ratings also throw light on the responses to the red-herring question. Only the 6- and 7-year-olds endorsed this question at beyond chance levels. It might be thought that this shows the use of a simple evaluative rule, but comparison of the confidence ratings with those for the far-behavior question shows that the picture is more complex. An ANOVA on the confidence ratings for these two questions by age showed a main effect for question type, $F(4,81) = 99.01$, $p<.001$ and a significant interaction with age, $F(4,81) = 11.17$, $p<.001$. Planned comparisons revealed that all except the 4-year-olds showed greater confidence for far-behavior predictions than for red-herring ones, all ps $<.0005$ (see Figure 2). Thus, even though the 6- and 7-year-olds picked the red-herring prediction beyond chance levels, they were still significantly less confident of their answers than for the far-behavior prediction, which was similar to the initial behavior in both value and meaning.

Individual trait pairs

Most studies of children's trait use either employ a very limited range of trait terms or assume that conceptions of traits can be seen as unitary: often performance differences between trait terms are not even reported. We assumed that there are indeed some general skills required to understand traits but that nevertheless different traits may tap additional more specific competences. Because we had no specific hypotheses about performance on individual trait pairs, we merely describe the differences between traits here and in the Results section of Experiment 2, and address their possible implications in the general discussion.

While children did well overall on the trait and near-behavior questions, analysis of their performance on individual trait pairs shows that their ability to make trait inferences of various types does not necessarily extend to all of the traits used. For each trait pair, we compared the number of subjects correct at each age with what would be expected by chance using a binomial distribution. The results in general showed a hierarchy of difficulty: that is, children gave correct answers on a particular question for some trait pairs consistently while they rarely did so for other pairs, and older children did not often fail trait pairs on which their younger counterparts were correct. For example, considering each of the 5 questions and 8 trait-pairs separately, there were only two occasions when younger children were correct on a specific trait-pair and question while older children were not.

For trait-label and near-behavior questions, the results were fairly polarised: while the youngest group performed above chance for only a few trait pairs the older groups did so on nearly all traits. Of greater interest is the more graded performance on the far-behavior and emotion questions. While the youngest children performed at chance levels on these questions, the 5- and 6-year-olds were above chance primarily for three trait pairs: selfish – generous, honest – dishonest and show-off – shy. Four other pairs were answered correctly for these two questions only by 7 year-olds and adults or by none of the children: these were cheerful – miserable, clever – stupid, lazy – energetic and timid – brave. Careless – fussy was in between, in that 6-year-olds were above chance on the far-behavior question and only 7-year-olds and adults on the emotion question.

The adults, while performing well above chance on all questions overall, were reluctant to make firm attributions for particular questions on one or two traits. For example, many subjects responded ‘can’t tell’ for the ‘not clever’ story. We had used the term ‘not clever’ instead of ‘stupid’ because we thought subjects would be unwilling to label a story character as stupid. It seems that even our euphemism was not enough to prevent this reluctance to attribute such a negative trait. Our other difficulty in devising stories for the ‘clever – not clever’ pair was that for the youngest children, cleverness is marked as much by physical skills as by intellectual abilities: we attempted to combine these two aspects in our story pair, but this may not have been entirely successful. In general, when adults failed to give the ‘correct’ answer, this was because they felt there was insufficient information. As Newman (1991) points out, adults may make trait attributions less readily than children in some cases, because they are more prone to consider how both dispositional and situational factors determine behavior. This may be particularly true of the psychology students who were our subjects.

Discussion

The results show that children from the age of 5 can make predictions of emotion from trait information. Although we adapted the experimental materials to make the task clear and simple for young children, the test we used was a stringent one: by making opposite predictions about pairs of contrasting traits, children had to use the trait information rather than some other simpler strategy such as social desirability. This finding is consistent with the idea that children develop an understanding of motivational states as subjective at around this age. Experiment 2 investigates the relation of these two skills in more detail.

The 4-year-olds in our study were capable of making predictions about future behavior for the near inference for one of the trait pairs, but never did so for the far inference, suggesting that they had an emerging understanding of traits as behavioral regularities (see also Eder, 1989) and that they did not use simple valence-based cues. Whether they made the predictions on some superficial similarity criterion (e.g. similar behavior to similar targets) or according to a deeper understanding of the conceptual links between similar behaviors is a matter for further research.

None of the age-groups showed evidence of using a simple valence-based rule. If children were using such a rule, then they would have made equally confident and correct predictions for near and far behavior and for red-herring behavior. The pattern of results above suggests that even the youngest children did not use such a strategy, because the same-value red-herring predictions were made consistently only from the age of 6. Although 6- and 7-year-olds chose these same-value, different-behavior red-herring options more often than chance, they still discriminated between these and far-behavior predictions, since they showed significantly more confidence in making predictions about far behavior than about red-herring behavior. Ratings of confidence seem to be rarely used in studies of this type, or with such young children, but the present results suggest that such ratings are a useful technique for teasing out different possible strategies in trait attribution.

It is interesting to note that adults, unlike 6-7 year-olds, did not choose the same-value red-herring option at more than chance levels. In comparison with the adults, the 6-7 year-olds might be said to show a valence strategy, but only in the sense that they endorsed the red-herring option with a low level of confidence. If children of this age are more prone to such valence-based judgements in general, perhaps they may be over-generalising their relatively newly-acquired understanding of the links between behavior patterns and internal states, and in this sense, are in the grip of a theory. Newman (1991) reported a related finding, that school-age children were more likely to predict from traits than adults, who are aware of situational determinants of behavior as well as dispositional ones.

The youngest children showed the most distinctive pattern of responses: this pattern was consistent with a simple situation-matching rule, since they were correct on trait labels, and on near behavior for one trait-pair, but not on far behavior or emotion. Thus, they showed no understanding of the causal aspect of traits or of situational variability. However, it is interesting to note that they too eschewed a simple value-based strategy. Furthermore, there was little evidence in the results overall of positive or negative biases: these would have been apparent if children were correct on one trait of a pair but incorrect on the other (e.g. because they predicted the positive behavior in each case). Where there was evidence of such strategies, they appeared for just four specific trait pairs (the cheerful, lazy, show-off and clever pairs), and there was no consistent bias – for example, on the near-behavior question for the lazy – energetic pair, 6-year-olds were better than chance on energetic but not lazy, while the reverse was true for 7-year-olds.

The three older groups of children and the adults performed better than chance expectation on far-behavior and emotion questions, suggesting an understanding of traits as generalisable across situations, and as causally implicated in the generation of emotions. The 6- and 7-year-olds also picked the red-herring choice more often than expected by chance. While the answer they picked was not 'correct' – it represented a different trait of the same valence as the target – the fact that they endorsed this response, but were also less confident of the inference than they were of the far-behavior inferences, shows that they were willing to make quite broad generalisations but in a discriminating way.

Only 5- to 7-year-olds and adults showed significantly more confidence in judgements of near than of far behavior, and this is consistent with the fact that it was only these groups who chose the correct far behavior more often than chance: while they consistently picked the correct choice, they understood that such an inference was less sure than that for the near behavior.

Experiment 2

In the introduction, we raised the question of the relation between understanding of desire and causal conceptions of traits. We suggested that the former is a prerequisite for the latter, and it seems from the present results that a causal understanding of traits arises at roughly the same age as does understanding of desire. However, a more direct test of the relation is to compare the same children's abilities in each area. Experiment 2 investigated this issue. We also used this experiment to make a more direct comparison between the difficulty of emotional and behavioral inferences than in Experiment 1. In that study, the prediction situations for each of the question types was different, because of the within-subjects design. Thus, the relative difficulty of emotion and far-behavior inferences, for example, may have reflected differences in the situations about which children had to make a prediction, despite our efforts to make the stories comparable. In Experiment 2, we used a between-subjects design where children made predictions about emotion or behavior for the *same* situation, so that we could compare the difficulty of these two inference types keeping the prediction situation constant. We used some of the easier trait terms from Experiment 1, and so included even younger children in this study, in the expectation that they might be able to make behavioral inferences for at least some of the trait pairs. We tested children from 3 to 7 years as this would give us a good mix of children who were either subjective or objective in the desirability task: older children would be primarily subjectivist.

Method

Subjects

We tested children in 4 age groups: 3-, 4-5, 6- and 7-year-olds. There were 29 3-year-olds, 14 in the Behavior condition (mean age 3;8, range 3;3 to 3;11, 9 girls) and 15 in the Emotion condition (mean age 3;7, range 3;1 to 3;11, 9 girls). Of the 29 4-5-year-olds, there were 15 in the Behavior condition (mean age 4;6, range 4;0 to 5;5, 7 girls) and 14 in the Emotion condition (mean age 4;7, range 4;0 to 5;5, 7 girls). Of the 25 6-year-olds, there were 12 in the Behavior condition (mean age 6;3, range 6;0 to 6;8, 6 girls) and 13 in the Emotion condition (mean age 6;5, range 6;1 to 6;8, 7 girls). Of the 22 7-year-olds, there were 10 in the Behavior condition (mean age 7;5, range 7;0 to 7;8, 4 girls) and 12 in the Emotion condition (mean age 7;3, range 7;1 to 7;7, 7 girls).

Design

The children at each age were randomly assigned to one of two conditions: in one they made inferences about behavior, and in the other they made inferences about emotion. There were 12 stories describing 6 contrasting pairs of traits, with either a behavior or an emotion question. For each story, children in both conditions also answered a trait question, to establish that they understood the basic stories. These trait questions were framed in terms of typical behavior rather than trait terms, as in Experiment 1. All children also completed a task assessing conceptions of desirability (see below).

Materials

The trait pairs were: selfish – generous, honest – dishonest, show-off – shy, timid – brave, careless – fussy and helpful – unhelpful. An example story pair and questions are shown in Table 2, together with the prediction situations for the other story-pairs.

Table 2 about here

Trait task: Each story was accompanied by four colored pictures depicting the two trait-consistent past behaviors and the alternative choices for behavior or emotion predictions and for the trait questions.

Conceptions of Desirability Task: This task was based on that used by Yuill (1984). Small dolls were used to act out a story in which an actor wanted to hit one of two other potential victims with a ball, this bad motive being represented by a 'think-bubble'. The actor then achieved the desired outcome and the child had to judge whether the actor was happy, sad or in between. Children heard two stories of this type. The objectivist response is to judge the actor sad, because something objectively bad happened, while the subjectivist response is to judge the actor happy at achieving what was desired.

Procedure

Children were tested individually in a quiet room by a female experimenter. The desirability task was always presented before the trait tasks. As in Experiment 1, two sets of traits were compiled with opposite members of each trait pair allocated to different sets. Both sets of stories were presented in the same random order for each child. The forced choice options for all questions were semi-randomised so that half of the time the correct response was given first and half of the time it was given second. Most children completed the task in two sessions but some of the younger ones required a further session in order to ensure their constant attention.

Results

1. Judgement of trait descriptions

In line with Experiment 1, we looked first at whether children gave correct responses to this question beyond chance levels over all the trait pairs as a whole. Children at all ages and in both inference conditions did so, all ps$<$.01, except that the 3-year-olds in the behavior condition did so only at $p<.05$. Unsurprisingly, though, older children performed better than younger ones: an ANOVA on the number of correct pairs by age showed a main effect of age, $F(3,95) = 12.63$, $p<.0001$, and planned comparisons ($p<.01$) showed that 3-year-olds were significantly worse than the older groups, and 4-5-year-olds were poorer than the two older groups (see Figure 3). There was no effect of condition, $F(1,95) = 2.2$, $p>.10$ and no interaction, $F<1$. There was a tendency for 7-year-olds in the behavior condition to score lower than those in the emotion condition, but this fell short of significance, $F(1,18) = 3.9$, $p<.07$.

Figure 3 about here: available in hard copy only

2. Inferences of behavior vs emotion

The results for the emotion question differ according to whether trait pairs or individual traits are considered, unlike in the analyses of Experiment 1, where both methods give similar results. This difference seems to arise because the traits for which emotion questions were answered correctly above chance were nearly all non-pairs while traits correct in the behavior condition nearly always were pairs (e.g. selfish – generous). Thus, in the emotion condition, considering number of pairs correct yields performance better than chance only in the 7-year-olds, whereas considering the more lenient criterion of individual traits, children from the age of 4-5 did better than chance, all $ps<.01$, consistent with Experiment 1. For the behavior condition, whether considering pairs or individual traits, children did better than chance from the age of 4-5 ($p<.05$ for this group and $ps<.01$ for older groups). The mean numbers of trait pairs correct for behavior and emotion predictions are shown in Figure 4.

An ANOVA on the number of predictions correct in the two conditions at each age, excluding 3-year-olds, who performed worse than chance, showed a main effect of age, $F(2,68) = 7.37$, $p<.001$, since older subjects did better overall. The effect of condition was also significant, $F(1, 68) = 4.28$, $p<.05$, and there was no interaction, $F<1$, although the condition effect is most marked in the 6-year-old group (see Figure 4).

Figure 4 about here: available in hard copy only

3. Individual trait pairs

There were fewer differences in performance between different trait pairs than in Experiment 1, probably because in the current experiment we used trait pairs that had been most easily understood by the youngest children in Experiment 1, in recognition of the fact that we included even younger children in the present experiment. Even so, selfish – generous continued to be one of the easier trait pairs, along with the new pair, helpful – unhelpful. The two other easy trait pairs in Experiment 1 (honest – dishonest and show-off – shy) were also easy here for the trait question but less so for the other questions. Careless – fussy was again moderately easy, while timid – brave, the only 'hard' pair taken from Experiment 1, remained hard, with only 7-year-olds doing better than chance on the behavior question, although even young children were good at the trait question for this pair.

4. Relation to conceptions of desirability

Children were classified as having an objective or subjective conception of desires according to their emotion judgements on this task, using the method proposed by Yuill et al. Children who said the actor felt happy in both stories were classified as subjective. Those who said that both actors felt sad, and who referred either to the intrinsic badness of the act or gave no justification, were classified as objective. Two children who rated the actor as sad, but also mentioned regret, were classified as subjectivist (moral). Children who gave inconsistent judgements were considered non-subjectivist, since they did not show a clear understanding of subjective desirability. There were 63 subjectivists, 2 of whom had given 'moral' answers and 42 non-subjectivists, made up of 26 clear objectivists and 16 inconsistent children.

We compared the mean number of pairs of correct inferences for the behavior and emotion questions for objectivists and subjectivists. The pattern of results was broadly similar whether or not we included the inconsistent children with the objectivists. The data (without the inconsistent children) are shown in Table 3. There was no difference between subjectivist and objectivist children on the behavior question, $t\ (41) = 0.90$, $p > .37$, but subjectivists scored significantly higher than objectivists on the emotion question, $t\ (44) = 2.69$, $p < .01$. Furthermore, in the behavior condition both subjectivists and objectivists scored above chance, $ps < .01$, but in the emotion condition, only subjectivists did so, $p < .0001$.

Table 3 about here

It might be thought that the relation between conceptions of desirability and causal understanding of traits is due entirely to the fact that both these skills increase with age. To assess this possibility, we computed the Kendall's Tau rank correlation between the two measures, partialling out the effects of age, using the method described by Siegel and Castellan (1988). Conceptions of desirability were scored as 1 for objective, 2 intermediate and 3 for subjective and moral. The trait score used was the number of trait pairs with correct emotion or behavior inferences. The partial correlation for the 54 children in the emotion condition was .31, $p < .001$, while that between desirability and behavior inferences for the 51 children in the behavior condition was not significant, $tau = .10$, $p > .15$.

Discussion

The results of Experiment 2 show a clear relation between children's conceptions of desirability and their understanding of traits as causal, as hypothesised. Children who understand that desires are subjective states that differ between individuals are also significantly better able to predict idiosyncratic emotions on the basis of traits than children with objective conceptions of desirability. It might be expected that subjectivist children are on the whole more cognitively mature, and so better at both tasks. However, the results show no difference from objectivist children in judgements of behavior, which according to our hypothesis do not require a causal understanding of traits. Furthermore, the relation of conceptions of desire and emotion inference from traits remains when the effects of age are statistically controlled.

The desirability task tests a rather specific aspect of the understanding of desire: the ability to understand a desire that is different from a standard or objective value. Children can predict emotions from desires on a simple basis of preferences from the age of 2-3 (e.g. Wellman & Woolley, 1990; Yuill, 1984), but cannot predict emotions from conflicting desires until about 4-5, when they also begin to understand traits as causal mechanisms. This suggests that conceptions of desire become progressively more refined during the preschool years. Further work needs to address the different implications of these changes for children's understanding of motivational states.

The results also confirm the suggestion in Experiment 1 that inferences of emotion are harder for young children to make than those about behavior, presumably because causal conceptions of traits emerge later than an understanding of traits as behavioral regularities. This is also in line with the study by Gnepp and Chilamkurti (1988), showing that children perform better on behavioral than on emotional inferences. Nearly all the previous work on trait understanding in children has focused, implicitly at least, on the behavior regularity view of traits.

General Discussion

These two studies support the theoretical link hypothesised between two hitherto distinct areas of research, and add a new theoretical input to the study of trait understanding, which has tended to be carried out either within a Piagetian framework or with respect to work in adult social psychology that does not provide a developmental account. Experiment 2 showed that a causal conception of traits, as measured by the prediction of emotional reactions from trait information, is associated with a conception of desires as subjective. This view of desires has been shown to emerge at around the age of 4-5 (e.g. Yuill et al., unpublished), while causal conceptions of traits, by the present evidence, emerge between 5 and 7 years. This emergence, which we assume is fostered by changes in understanding desire, may in turn have a role to play in the marked increase in spontaneous use of trait terms observed in children from the age of about 7 (e.g. Livesley & Bromley, 1973).

The results of Experiment 1 also provide further information about the possible strategies used by children to predict behavior from trait information. Surprisingly, there was no evidence of a straightforward valence strategy – predicting that people with any positive trait will perform any positive future behavior. Six- to 7-year-olds did show a tendency to endorse different but same-value behaviors (the red-herring questions) but, even then, judged themselves less confident of such predictions than predictions of more similar behavior. Younger children tended to show a situation-matching strategy.

In terms of absolute levels of performance, it is interesting to note that even 3-year-olds in Experiment 2 were able to label some traits appropriately. There has been very little experimental work on trait understanding in children of this age, although Eder (1989) showed that 3 1/2 year-olds could describe themselves and others in rather global trait terms (e.g. good, naughty). However, naturalistic studies suggest that preschoolers have available a repertoire of words that could potentially be used as trait terms. Bretherton and Beeghly (1982) found that 28-month old children have a vocabulary of emotion terms, some of which shade into trait terms, notably the evaluative labels nice, good, bad and naughty. Another relevant study looked at parental reports of vocabulary in children from 18 months to 6 years. Ridgeway, Waters and Kuczaj (1985) asked parents to report the age at which their children could understand and use a list of 125 adjectives. Ridgeway et al. describe these words as 'emotion-descriptors', but many of the words judged as known to the younger children, such as happy, helpful and friendly, could be used as personality descriptors, too.

Most studies of trait understanding treat traits as a single, homogeneous category, and often include only a very few traits or do not report analyses of individual traits. In current parlance, traits are assumed to be a 'domain'. We assume that while there may be some conceptual abilities, such as conceiving of desires as subjective, that underlie trait understanding, it is also feasible to think that different traits make different demands on children's understanding. Some trait pairs in this study were harder for children than others yet little of the work on children's trait understanding has addressed this issue. Some of the terms used here appear in the study by Ridgway et al., and there seems to be some commonality in the order of difficulty. Helpful, which was easy to judge in the present study, was judged to be known by the majority of children from the age of 2, and shy, another relatively easy trait, by three and a half. In contrast, cheerful, miserable, timid and brave ('daring' in the Ridgeway et al. study), all hard in the present study, were judged not to be generally known until 5 or older.

Further work could investigate the factors that may contribute to differences in the ease with which trait terms can be understood. One possibility is that some trait terms do not require any understanding of underlying emotions. Fletcher (1984) notes that terms such as untidy, punctual and talkative are purely behavioral dispositions: that is, the expression of the behavior *is* the disposition. Someone would not be called untidy unless they behaved in an untidy way. Other dispositions, such as artistic and clever, can be attributed to someone even if they are rarely expressed. In the present experiment, helpfulness was probably the trait term closest to

Fletcher's idea of a behavioral disposition, and this may account for why it was particularly easy for children to understand. Most trait terms, though, are regarded by Fletcher as intermediate in the continuum of behavioral – mental terms.

Another possible influence on the difficulty of traits is the distinction drawn by Yuill (1992b) between 'social-intention' terms, such as kind, sharing and helpful, and 'internal-state' terms such as brave, calm and fussy. The first category focuses on social motivations, exemplified by actions directed towards others, while the second category refers primarily to the internal mental states of the actor. To the extent that the present experiments used trait terms in these two categories, it seems that, as Yuill predicted, social-intention terms are easier for children to understand, and to make generalisations from, than internal-state terms. For example, children made more correct inferences for selfish-generous and helpful-unhelpful than for brave-timid.

We are not arguing that understanding subjective desire is all that is needed for understanding any trait. Some traits make extra demands on cognitive abilities: for example, appreciating paranoia requires a good grasp of the ways in which beliefs, as well as desires, determine action, and the traits of optimism and pessimism involve differences in general expectations. The conclusions drawn from any study of traits will depend to an extent on the types of trait terms used, and most previous studies have focused primarily on social-intention terms. Further theoretical work on the different types of traits and their cognitive demands is therefore needed. As well as averaging over traits or using one or two traits to represent the entire domain of traits, researchers need to consider differences between traits as an area of investigation in itself (e.g. see Reeder, 1993).

The current results may also be used to flesh out Wellman's (1990) suggestions about the integration of traits into a general model of belief-desire reasoning. He proposes that a precursor of the concept of trait is the notion of preferences: simple likes and dislikes that explain recurring activities. Obviously, such a conception is purely behavioral, but as children's understanding of desire grows, their appreciation of traits as causal factors underlying action will emerge, and their use of trait terms should become broader and more flexible.

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Table 1: Example story pair: Experiment 1

SELFISH

This is Mary. She always stops her little brother playing with her toys. Whenever she has a bag of sweets, she eats all of them herself and doesn't give any to anyone else.

NEAR BEHAVIOR

One day Mary sees her little sister putting on one of her hats. Does Mary tell her little sister to take off the hat or let her little sister wear it?

FAR BEHAVIOR

One day Mary's classmates ask to have a go on her new computer game. Does Mary hide it from them or let them have a go?

EMOTION

One day it's Mary's birthday and her Mum makes a delicious birthday cake. Does Mary feel sad or happy about giving the children at her party some of the cake?

TRAIT QUESTION

Which is the best word to say what sort of person Mary is? Selfish or untruthful?

RED HERRING

One day the teacher asks who wants to be in an egg and spoon race. Does Mary say, 'I'll just sit here and watch the race' or 'I'll be in the race'?

GENEROUS

This is Rachel. She always lets her little sister play with her games. Whenever she has a bar of chocolate, she eats some herself and then gives the rest away.

NEAR BEHAVIOR

One day Rachel sees her little brother putting on one of her pairs of socks. Does Rachel let her little brother wear the socks or tell him to take them off?

FAR BEHAVIOR

One day Rachel's classmates ask to play with her new kite. Does Rachel let them have a go or does she hide it from them ?

EMOTION

One day it's Rachel's birthday and her Mum makes up some party bags for the guests. Does Rachel feel happy or sad about giving the children at her party the party bags?

TRAIT QUESTION

Which is the best word to say what sort of person Rachel is? Generous or truthful?

RED HERRING

One day the teacher asks who wants to be in a sack race. Does Rachel say 'I'll be in the race,' or 'I'll just sit here and watch the race'?

Other trait-pairs:

PAIR (and TRAIT Q.)	TRAIT INFORMATION	NEAR PREDICTION	FAR PREDICTION	EMOTION	RED HERRING
Cheerful Miserable (Generous Selfish)	quick or slow to forget injury, expect day to be sunny/rainy	response to bus breakdown on school trip	response to visit from cousin	response to pool being closed	admit or deny breaking plate
Generous Selfish (Untruthful Truthful)	permit or deny toy sharing with sib, share sweets	permit or deny brother borrowing possession	response to turn-taking at school	response to sharing party bags	join in or watch race
Truthful Untruthful (Lively Lazy)	admit or deny spillage, pay or avoid paying for tickets	admit or deny breakage	pick apples from tree with or without asking	response to suggestion of returning cash found	response to bus breakdown on trip
Energetic Lazy (Cheerful Miserable)	pick activity or doze, choose hard or easy task	join in or watch race	get up early or late	response to suggestion of walking to school	response to borrower of possessions
Show-off Shy (Rich Poor)	do or just watch party tricks, show or hide work	leader or follower in game	agree or refuse to act on stage	response to chance to go on TV	swim or not after having hair styled
Brave Scared (Sleepy Wide-awake)	avoid or seek scary TV scenes	avoid or seek scary story	ask for or refuse push on swing	response to climbing to top of slide	mend or fail to mend broken machine
Careless Fussy (Hungry Thirsty)	splash in or avoid puddles, crumple or fold clothes	seek or avoid sand play wearing new clothes	change or keep soiled clothing	response to invitation to finger paint	seek or avoid scary film
Clever Not clever (Healthy Unhealthy)	fix or fail to fix bike, remember or forget facts	mend or not mend broken blind	find strategy or not for finding dog	response to being given mendable box	watch or join in song

Table 2: Example story pair: Experiment 2

SHOW-OFF

This is Tommy. When he's at parties he always makes his friends giggle by doing tricks. When he's at school, he keeps on putting up his hand and going to the front of the class to tell the others all about himself.

One day Tommy wears one black and one white shoe and the children at school laugh.

EMOTION QUESTION

Do you think Tommy is happy or sad when the children do that?

BEHAVIOR QUESTION

Do you think Tommy shows the shoes off or does he try to hide the shoes?

TRAIT QUESTION

Is Tommy the kind of boy who always gets noticed a lot or always reads a lot?

SHY

This is Andrew. When his friends play at pulling funny faces , he always laughs but he never pulls funny faces himself. When he's at school he never puts his hand up, and when he has to answer questions he looks down and answers very quietly.

One day Andrew wears one red shoe and one blue shoe and the children at school laugh.

EMOTION QUESTION

Do you think Andrew is happy or sad when the children do that?

BEHAVIOR QUESTION

Do you think Andrew shows the shoes off or does he try to hide the shoes?

TRAIT QUESTION

Is Andrew the kind of boy who never gets noticed much or never reads much?

Other trait-pairs:

PAIR (and TRAIT Q.)	TRAIT INFORMATION	PREDICTION (of behavior or emotional reaction)
Helpful Unhelpful (never/always helps/plays)	help old person, carry shopping vs lack of help	request to tidy room
Generous Selfish (never/always shares/jokes)	share toys with sib, sweets with peers vs no share	request to share new game
Honest Dishonest (never/always does the right thing/works hard)	admit to breakage, pay fares vs shift blame, dodge fares	suggestion to return lost money
Extrovert Introvert (never/always gets noticed/reads)	perform vs watch tricks, active vs self-effacing in class	friends laugh at odd shoes
Timid Brave (never/always gets scared/talks)	approach or avoid dog and scary film	suggestion to go to top of slide
Careless Fussy (never/always fusses/laughs)	splash or avoid mud, has untidy or tidy room	suggestion to do messy finger-painting

Table 3: Mean number of trait pairs correct (/6) in objectivist and subjectivist children for behavior and emotion predictions

	Conception of desire		
	objectivist	subjectivist	difference
Prediction			
Behavior	2.29	2.79	0.50
Emotion	1.15	2.61	1.46