Body proportions as information for age and cuteness: Animals in illustrated children's books

JOHN B. PITTENGER

University of Arkansas, Little Rock, Arkansas

Growth systematically changes the body proportions of both humans and animals so that the ratio of head height to body height decreases with age. Prior studies have demonstrated that body proportions provide effective information for age perception. To test the proposal that illustrators incorporate this information into their drawings, measurements were made of the head and body heights of 100 pairs of animals appearing in children's picture books. In 93 pairs, the animal intended to be perceived as older had a smaller head-to-body ratio than did the younger animal. Ratings collected for 25 of these pairs showed that both perceived age and cuteness are significantly correlated with body proportions. The magnitudes of the correlations were only modest, suggesting that other aspects of the drawings influenced perceived age and cuteness. In addition, observers reported that body proportions are only one of a variety of factors influencing age and cuteness perception. As has been found in other studies, perceived age and cuteness were negatively correlated.

How can events be portrayed in static pictures? One potential answer to this question is suggested by J. J. Gibson's approach to picture perception (1971). He argued that pictures and real objects can lead to the same perceptions because they contain the same information. Applied to perception of events portrayed in static pictures, this theory would hold that aspects of the patterns of change that serve as information for real events can be incorporated into pictures of events.

The studies reported here concern the depiction of age in drawings of animals in children's books. Specifically, they test the proposal that illustrators portray an animal's age by incorporating the changes in body proportions characteristic of actual growth into the drawings.

From the perspective of the ecological approach to perception (Gibson, 1979), this proposal contains two assumptions about growth and its perception. The first is that there exist regularities in the visible patterns of growth. That is, there is visual information for the perception of growth. Second, detection of this information supports perception of growth and age. Prior research justifies these assumptions about the perception of human growth.

Cardioid strain, a precisely defined mathematical function, has been shown to capture the changes in size and shape of the growing human head. When this transformation is applied to faces represented by drawings (Pittenger & Shaw, 1975a), photographs (Mark & Todd, 1983) or a three-dimensional bust (Mark & Todd, 1983), observers report that the faces appear to be growing older.

Human growth also involves a systematic change in the vertical proportions of the body. The rate of growth is most rapid in the legs, becoming progressively less rapid toward the head. The head, therefore, becomes smaller relative to the rest of the body. An equation, called a *tapered stretch*, that produces these changes in vertical proportions was developed by Medawar (1944) on the basis of data reported by Stratz (1909). More recently, Alley (1983b) and Pittenger and Todd (1983) produced drawings of human figures in which body proportions were varied. All other aspects of form were held constant. They found that observers' age estimates increased as relative head size decreased.

These transformations also influence the perceived age of nonhuman bodies. Pittenger, Shaw, and Mark (1979) applied cardioid strain to cartoon-style faces of a bird, a dog, and a monkey and found that the animals were perceived to be growing progressively older. They also applied strain to drawings of Volkswagen "beetle" automobiles, objects that do not grow. Observers again reported perception of increasing age. Pittenger and Todd (1983) applied tapered stretch to drawings of the bodies of a robot (which cannot grow) and a fanciful creature from an other planet (which has no real counterpart) and found perceived age to increase as relative head size decreased.

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The research reported below addresses two questions about the use of body proportions as age information by book illustrators. First, do they manipulate proportions so as to influence perceived age? Illustrators need not vary body proportions. A variety of alternate sources of age information could be used instead: body size, style of clothing, activities indicating age, verbal statements of age in the book's text, and so forth.

Second, if proportions are varied, do they actually influence perception? The answer to this question is not readily predictable from the results of prior studies. Book illustrations are more complex than those typically used in perceptual research. The former are intended to represent, simultaneously, many of an animal's characteristics; age, sex, emotional state, activities in which it is engaged, and so on. In this context, proportions might have less impact on perception than in studies in which they are the only factor distinguishing one picture from another. In the studies cited above, researchers varied only body proportions or head shape (though see Alley, 1983a, 1983b, and Mark et al., 1980).

It would be helpful to know how body proportions of different species of animals change with growth. However, although animal growth has been studied extensively, I have been unable to find data on changes in body proportions. Informal measurements of body proportions shown in photographs of young and adult animals suggest that decreasing relative head size occurs in many species of mammals. These data are, however, hardly definitive.

STUDY 1

Method

Selection of drawings. Illustrated children's books were searched for drawings of "anthropomorphized" animals. Such animals are shown acting like humans—talking to each other, wearing clothing, living in carpentered houses, and so forth. There were several reasons for selecting drawings of this type. First, stories involving animals acting like humans are especially popular with children. Thus, a large sample of these drawings was available in local libraries. Since these animals are often shown as standing upright, it was possible to make accurate measurements of body length. In addition, anthropomorphized animals were generally drawn in a highly stylized fashion. Systematic changes in body proportions could occur in realistic drawings merely as the result of copying the actual body forms of the animals. In caricatures of animals, on the other hand, the appearance of a correlation between body proportions and the intended age of an animal might be more likely the result of the illustrators' intentions.

Animals were selected in pairs to meet the following criteria: First, the animals within each pair were of the same species. Second, the criterion for "anthropomorphized" was that the animals talked to each other. As it turned out, animals meeting this criterion usually also engaged in other human activities such as living in houses, wearing clothes, and so forth. Third, a difference in the ages of the two animals could be established independently of body proportions. The older of the animals in a pair was usually indicated both by a difference in size and by activities in which the animals were engaged. Most pairs turned out to consist of a parent and its child. The activities of most of the younger animals suggested that their ages corresponded to those of humans past the toddler stage but

not yet teenagers. Few "infants" or "teenagers" appeared in this sample. It was only rarely possible to assess the exact age, expressed in years, that the illustrator intended for an animal. Therefore, the analyses in both Study 1 and Study 2 are of the relation between body proportions and relative ages (i.e., younger versus older), rather than between proportions and ages in years. Fourth, the animals' postures had to be upright or nearly upright, so as to allow accurate measurement of vertical body proportions. Finally, only a single pair was selected from the work of any one illustrator.

These criteria turned out to be rather difficult to meet: A search through several thousand books produced 100 pairs of acceptable drawings.

Measurements and ratio calculations. Head height was measured in arbitrary units from the highest point on the head (excluding ears) to the lowest point on the jaw. Body height was measured from the highest point on the shoulders to the point where the animal's feet met the ground.

For each animal, the *head-to-body ratio* was computed as the head height divided by the body height. For each pair of animals, a variable to be called *K* was computed as the head-to-body ratio of the younger animal divided by the head-to-body ratio of the older animal.

Results

As growth proceeds, the head occupies a decreasing proportion of body size. Therefore, illustrators' use of growth-produced patterns in body proportions as age information would be demonstrated by observation of *K*s greater than 1.0—that is, cases in which the head of the younger animal (relative to its body size) is larger than the head of the older animal (relative to its body size). *K* was found to be larger than 1.00 for 93 of the 100 pairs. Among the other 7 pairs, only 2 had a *K* less than .90. The distribution of observed values of *K* is shown in Figure 1.

Discussion

The results are strongly in the predicted direction. Illustrators draw animals so that those intended to appear as younger have larger relative head sizes than those intended to appear as older. Thus, they are incorporating this simple aspect of the pattern of actual growth into their drawings.

The precision with which illustrators are incorporating actual changes in human and animal proportions cannot be discovered without better knowledge of actual animal growth. However, several observations can be made.

First, it appears that illustrators are not using the precise proportions of real animals. In the present set of drawings, the head-to-body ratios of adult animals within each species vary widely, more than seems consistent with strictly realistic portrayal of the body form: Among mice, the ratios varied from .22 to .53; among bears, .16 to .53; among pigs, .25 to .47; and among rabbits, .19 to .49.

Second, the head-to-body ratios of these animals tend to appear larger than those of real humans. As reported by Stratz (1909), the head-to-body ratios of adults, 2-year-olds, and newborns are, respectively, about .15, .25, and .35. The ratios for the animals in this study are generally greater than .25, with many greater than .35. That is, the

Figure 1. Frequency distribution of values of K .

animals have proportions like those of very young, even prenatal, humans. Thus, the illustrators are not imposing human proportions on these animals. To some extent, they may simply be following body proportions of real animals. However, as noted earlier, they are not doing so very strictly.

The relatively large heads indicated by these ratios may also be due to illustrators' attempts to make the animals appear especially cute. Alley (1981) and Brooks and Hochberg (1960), among others, have shown that incorporation of more youthful features into human faces leads them to be seen both as increasingly cute and more in need of protection. Gould (1979) has observed that as Mickey Mouse's personality was changed over several decades from that of a somewhat nasty character to that of his current lovable self, he was drawn with a progressively more youthful body and face.

Although the head-to-body ratios of the animals tend to be larger than those of humans, the observed K s are close to those of pairs of humans of comparable relative ages. Again using Stratz's ratios for humans, the K s for 2-, 6-, and 12-year-olds compared to an adult are, respectively, 1.78, 1.36, and 1.17. The animal drawings consisted mainly of an adult and a child, with the children mainly between the toddler and teenage years. Of the 100 observed values of K , 66 fell between 1.15 and 1.80.

This correspondence between human and animal K s could be a result of illustrators' use of the actual pattern of animal growth. Such use would assume an invariant of growth across species: While animals vary in their body proportions and rates of overall growth, they share a single pattern of change. On the other hand, illustrators may be imposing human K s on the animals so as to influence the animals' perceived *relative* ages.

STUDY 2

Method

Previous research (Alley, 1983b; Pittenger & Todd, 1983) has shown that, when other factors are held constant, decreases in relative head size lead to the perception of increased age. The results of Study 1 demonstrated that illustrators nearly always draw the animals intended to appear older with smaller relative head sizes. Study 2 was done to assess the effectiveness of body proportions as age information in these drawings.

Although illustrators presumably intend proportions to influence perceived age, they incorporate a variety of sources of age information into their pictures. Thus, we cannot be sure, on the basis of prior studies, of the influence that proportions have on the ages perceived in these more complex drawings.

A subset of the animal pictures used in Study 1 was presented in two age-rating tasks. These tasks were used to compare the salience of information about body proportions in two conditions. One task called for judgments of the relative ages of animals shown in pairs, whereas the other involved judgments of the ages of individual animals. Since the animals within each pair are usually quite similar, the differences in their body proportions might be especially noticeable when the animals are shown simultaneously. If so, correlations between ratings and proportions should be higher when the animals are shown in pairs.

Since previous research (Alley, 1983a; Brooks & Hochberg, 1960) has shown that perceived cuteness is influenced by age information and is inversely correlated with perceived age, cuteness ratings were also collected.

Drawings. Twenty-five pairs of drawings from Study 1 were selected so as to encompass the full range of both head-to-body ratios and values of K . Each animal was traced to remove the background (buildings, ground, furniture, etc.). In some cases, obvious sources of age information, such as a pipe smoked by an adult or differences between the clothing of adults and children, were removed by slightly redrawing the figures. The sizes of the drawings were transformed so that the younger and older animals within each pair had the same vertical height. The resulting black and white pictures were photographed onto slides.

Presentation conditions. The drawings were presented in four conditions. Ratings of age and cuteness were collected, both for individual animals (*singles* conditions) and for pairs of animals (*pairs* conditions).

In the *pairs-age* condition, observers rated the relative ages of the animals in each pair. They were told that illustrators of children's books often portray families of animals who act like humans and that the illustrators needed to solve the problem of making the members of the family look to be of the appropriate ages. They were informed that the experimenters had formed some hypotheses about how illustrators portrayed age and that the purpose of the experiment was to test these hypotheses.

Observers indicated their ratings by checking one of nine lines printed in a row. Two sets of labels were printed above the row of lines, one set indicating which animal appeared to be older and the other set indicating the degree of difference. The first set of labels was arranged as follows: The words "Left Older" were printed above the four leftmost lines; the word "Equal" above the center line; and the words "Right Older" above the four rightmost lines. The second set of labels was printed below the first. The labels "Very Much Older," "Much Older," "Moderately Older," and "Slightly Older" were printed, from left to right, above the four leftmost lines. The same labels were printed, in reverse order, above the four rightmost lines. Observers were asked to make their judgments in two stages. They were instructed first to judge which, if either, of the two animals looked older, checking the center line if they appeared to be of equal age. If the ages appeared to be different, the observer was instructed to mark the line indicating which animal looked older and the degree of difference in ages.

In the *singles-age* condition, observers rated the perceived ages of the individual animals. Observers were again informed that we were testing hypotheses about how illustrators portray the ages of animals shown in children's books. Each line of the response form was labeled with both an age category and a range of ages: "Infant (less than 1 year)"; "Young Child (1-4 years)"; "Middle Childhood (5-9 years)"; and so on, up to "Late Middle Age to Elderly (over 55 years)." In the instructions, observers were asked to select the age category that seemed most appropriate for each animal. They were informed that the ages printed with the category names were those for humans in that category. These ages were to be used to help them understand the meaning of the category names.

The response form for the *pairs-cuteness* condition was the same as that for the *pairs-age* condition, except for the replacement of "Older" by "Cuter" in all labels. Observers were instructed to use a two-stage judgment procedure similar to that used for the *pairs-age* condition. Observers in both cuteness conditions were told that the purpose of the experiment was to test some of our hypotheses about how illustrators were able to make animals shown in children's books take on different degrees of cuteness.

On the response form used in the *singles-cuteness* condition only five of the lines were labeled, with alternate lines remaining blank. The labels were, from left to right: "Not At All Cute," "Slightly Cute," "Moderately Cute," "Very Cute," and "Extremely Cute." Observers were instructed to interpret the unlabeled lines as representing degrees of cuteness intermediate between those indicated by the labels over the other lines. They were asked to check, for each animal, the line that best described their perception of the animal's degree of cuteness.

Procedure. Observers were tested in small groups. In pairs conditions, the animals in each pair of drawings were projected side by side on a blank wall. Pairs were presented for as long as the observers needed for making judgments, usually about 5-10 sec. After all pairs had been judged, observers were instructed to write a description of the aspects of the drawings that seemed to influence their judgments. Testing in the singles conditions was similar, except that no written responses were collected.

A single set of three presentation orders was used for both of the pairs conditions. The orders were random, except that neither

more than three young animals nor more than three old animals appeared in succession on the same side of the screen. Three other orders were used in the two singles conditions. These were random, except for two constraints. First, one animal from each pair was presented in the first 25 trials, and the other was presented in the second 25 trials. Second, neither more than three young nor more than three old animals appeared in succession.

Observers were 180 University of Arkansas at Little Rock undergraduates participating voluntarily for extra credit in a psychology course. Forty-five were tested in each condition, with 15 being assigned to each presentation order.

Results

Age judgments: Pairs condition. Ratings were coded as integers from 1 to 9. The scoring procedure was arranged so that the more strongly an observer's perception of the animals' relative ages followed the relative ages intended by the artist, the higher the score. For example, if an observer marked the rightmost line (indicating that the animal on the right was "Much Older" than the one on the left) and the animal on the right was intended to appear older by the illustrator, this response was scored as 9. If the second line from the right ("Moderately Older") had been checked, the rating would have been scored as 8. If the animal on the left was intended to look younger, a mark on the rightmost line was scored as 1. (Henceforth *young* and *old* will be used to refer to the relative ages of the animals in each pair as intended by the artist. These ages will be distinguished from observers' ratings of the animals' ages, which will be referred to as *perceived* or *rated* ages.)

If body proportions are effective age information, then we should observe that large values of K (which occur when the older animal has a much smaller relative head size than the younger animal does) are associated with large rating numbers (which occur when the older animal is perceived to be much older than the younger one). Therefore, if animals with relatively smaller heads are seen as older, correlations between the values of K and the age ratings will be positive.

A product-moment correlation coefficient between ratings and values of K was computed for each observer over the 25 pairs of animals. As may be seen in Table 1, the majority of the coefficients, 40 of 45, are in the predicted direction. Tests of the significance of individual coefficients would, given the large number of tests, produce a serious problem with inflation of the overall probability of Type I errors. Therefore, significance was tested by comparing the observed distribution of coefficients with the distribution expected under the null hypothesis that the population coefficients were zero for all observers. A significant difference between the observed and expected distributions would show that the observers, as a group, were responding to body proportions.

Several statistical operations were required to compute the distribution of sample coefficients expected under the assumption of zero-valued population coefficients. First, using Fisher's r -to- z transformation, the proportions of r s (based on $N = 25$, the number of pairs rated) expected to give z s in the intervals $< -.2$, $-.2$ to $-.1$, $-.1$ to

Table 1
Distributions of Correlation Coefficients of Ratings with Body Proportions

Variables	Value of Correlation Coefficient											
	-.5	-.4	-.3	-.2	-.1	-.0	+0	+1	+2	+3	+4	+5
Pairs age ratings and values of <i>K</i>				1	2	2	7	11	12	7	1	2
Singles age ratings and head-to-body ratio	1	14	10	14	3	2	1					
Pairs-cuteness ratings and values of <i>K</i>	1	2	10	11	9	9	1	0	1	1		
Singles-cuteness ratings and head-to-body ratios				1	5	11	14	10	4			

Note—The values of the correlation coefficients listed in the heading refer only to the first decimal place of the coefficients. Thus, for example, +.0 includes all values from 0.00 up to, but not including, +.10.

+1, +.1 to +.2 and >+.2 were computed. These proportions were then multiplied by the number of observers to produce the frequencies expected under the null hypothesis. The predicted and observed frequencies were entered into a chi-square test of goodness-of-fit. The resulting statistic [$\chi^2(4) = 46.07$] shows a difference significant beyond the .001 level. The tendency of the correlations to be positive shows that body proportions are effective information for the perception of age.

The correlation coefficients are, however, rather small. Reasons for the modest size of the correlations are suggested by observers' reports of the aspects of the drawings that influenced their judgments.

A total of 144 legible and interpretable comments were made by observers. Many were vague, in that they did not specify exactly what aspect of a characteristic influenced the judgments (e.g., "Clothes were different and I looked at their postures."). Still, some tentative conclusions may be drawn.

First, there is little evidence that observers were aware of much influence of body form on their judgments. Only two observers specifically referred to the relative sizes of the head and body. Eleven referred to body build. However, these comments were usually so vague that it is not clear what aspect of body form was intended. Eighteen others made reference to differences in "sizes" and "heights" of the animals. These are somewhat paradoxical, since, within each pair, the animals were presented at the same vertical heights. The majority of comments (113 of 144) referred to aspects other than body form: face (20 references), posture (26), emotional expression (26), and clothes (23). The remaining 18 comments cited an assortment of factors: two comments, for example, were that "Fuzzy lines make them look younger" and "Aggressive-looking ones are older." Although it is difficult to interpret these in any detail, they do suggest that many factors other than proportions influenced the ratings.

Age judgments: Singles condition. Age ratings were scored as integers from 1 to 9, with 1 corresponding to selection of the youngest age category. For each observer, a product-moment correlation was computed between age ratings and head-to-body ratios over the 50 animals. The distribution of the resulting coefficients is presented in

Table 1. Since head-to-body ratios decrease with growth, an observer's use of the ratios would be reflected in a negative correlation coefficient. The coefficients were found to be negative for all but 1 of the 45 observers. A goodness-of-fit test like that performed for the ratings of pairs was used to assess statistical significance. Observed and expected frequencies were computed as before, except that an *N* of 50 (the number of animals rated) was used to calculate the expected frequencies. The resulting statistic [$\chi^2(4) = 367.02$, $p < .001$] shows that smaller relative head size tends to be associated with greater perceived age.

The correlation coefficients are again small, ranging mainly from the -.2s through the -.4s. Thus, as with the pairs condition, the influence of proportions on perceived age was only moderately strong.

Cuteness judgments: Pairs condition. Ratings were scored as integers from 1 to 9. A score of 1 corresponded to selection of the younger animal as "Very Much Cuter," whereas one of 9 indicates that the older was rated as "Very Much Cuter." It was expected that *K* would show a negative correlation with the ratings. That is, large *K*s (which correspond to the younger animals' having relative head sizes much greater than the older ones') would be expected to produce lower rating numbers (which correspond to the younger animal's being selected as cuter).

The distribution of product-moment correlations of *K* with individual observer's ratings are shown in Table 1. All but three are negative. A goodness-of-fit test, like those performed for the age ratings, gives $\chi^2(4) = 48.58$, $p < .001$. This shows that there is a significant tendency for larger head size to be associated with greater perceived cuteness.

Observers made a total of 129 legible, interpretable statements as to the factors that influenced their judgments of relative cuteness. Facial expression seemed especially salient, being cited by 35 of the 45 observers. Other frequently mentioned factors were body shape, including chubby-rounded vs. thin (11 mentions), posture (13), and level of detail and line quality in the drawing (17). Other comments included such factors as clothing, eye roundness, an animal's "motion," and sex. Only six observers mentioned age, each saying that younger animals looked cuter.

Cuteness judgments: Singles condition. Ratings were scored from 1 to 9, with larger numbers corresponding to greater cuteness. Distributions of correlations of head-to-body ratios with cuteness ratings are shown in Table 1. Larger head sizes were expected to be associated with greater cuteness. However, the data of only 28 of the 45 observers showed a positive correlation. A goodness-of-fit test over all 50 animals was not significant [$\chi^2(4) = 3.89, p > .05$].

Correlation of age and cuteness judgments. Mean ratings of age and cuteness were computed over observers for each of the 50 animals presented in the single conditions and for each of the 25 pairs of animals presented in the pairs conditions. The product-moment correlation between mean rated age and mean rated cuteness was $-.66$ ($p < .001, N = 50$) for the singles condition and $-.71$ ($p < .001, N = 25$) for the pairs conditions. These results show that animals perceived as younger also tend to be seen as cuter.

Comparison of singles and pairs conditions. The pairs age judgments are not more strongly correlated with proportions than are the singles judgments. For 22 observers, the correlation of pairs judgment with K are greater than $+.20$. For the singles condition, 39 observers showed correlations between judgments and head-to-body ratio of less than $-.20$. (Recall that in the singles condition large negative correlations indicate strong and appropriate response to proportions.) For age judgments, observers thus appear to be making more use of individual animals' proportions than of relative proportions.

For cuteness judgments, the reverse appears to be true. In the pairs condition, 24 observers showed correlations of less than $-.20$ between cuteness ratings and K . Only 4 observers in the singles condition showed coefficients larger than $+.20$ between ratings and head-to-body ratios. Therefore, it may be that proportions are especially salient as information for cuteness when the pairs of animals are shown simultaneously.

SUMMARY AND GENERAL DISCUSSION

The results of Study 1 show that illustrators consistently draw animals so that older ones have smaller relative head sizes than do younger ones. While it seems reasonable to suppose that this use of proportions is based on illustrators' knowledge of growth, the specific nature of that knowledge is unclear. It could consist of a rather precise understanding of the exact patterns of growth-produced change in the body proportions of various species of animals. However, it seems more plausible to suppose that illustrators operate on the basis of a simple rule that can be applied to all species: The younger you wish the animal to appear, the larger you should draw its relative head size. The exact proportions to be used could then be selected to suit the particular species being drawn, degree of cuteness desired, and so forth.

The results of the age-rating conditions in Study 2 show that perception of age is influenced by body proportions: Animals with smaller relative head sizes tend to look older. However, both observers' statements and the modest size of the correlations between proportions and age ratings show that other characteristics also influence perceived age.

This finding is consistent with the facts of actual growth, illustrators' portrayal of growth, and the results of other studies of age perception. The growth of real animals involves increase in size, changes in body contours, and so forth, as well as change in head-to-body ratios. Illustrators include these factors in their drawings. In several other studies (e.g., Mark et al., 1980; Pittenger & Shaw, 1975b), it has been found that age perception is influenced by multiple sources of information.

Cuteness judgments are significantly correlated with body proportions; larger relative head size is associated with greater cuteness. This result is consistent with the previous findings that more youthful looking faces are seen as cuter than older looking ones (see Alley, 1981, for a report of one study and references to others). Alley (1981) also presents an argument, based on one by Konrad Lorenz (1943), for the ecological value of perceiving younger faces as cuter. In brief, the proposal is that adult members of a species should tend to protect and give care to younger members. Positive affective responses, such as perception of cuteness, to babyish faces could be part of the chain of responses leading to caregiving.

The correlations between cuteness and age ratings are higher than those between either set of ratings and body proportions. This suggests that body proportions are only one factor in perceived cuteness. Observers in the pairs-cuteness condition cited a variety of factors as influencing their choices, some of which were also cited by those making age ratings. A complex relation between growth factors and social perceptions such as cuteness has also been found by Berry and McArthur (1986, 1988) in their studies of facial appearance.

Comparison of the singles and pairs conditions provides little support for the hypothesis that the age information in body proportions is especially influential when pairs of animals are presented simultaneously. The effect of proportions seems to lie largely in the head-to-body ratios of individual animals rather than in the difference in ratios of a pair. For cuteness judgments, however, simultaneous presentation of pairs does seem to make proportions more salient.

Finally, the results of these studies serve to remind us of the importance of testing the role of a source of perceptual information in its natural context. Body proportions are an extremely powerful influence on perceived age when shown in isolation from other sources of age information. However, when the pictures that illustrators actually put into books are rated, proportions are less powerful, interacting with a variety of other sources of

age information. Neither sort of study can, by itself, give us a complete understanding of people's use of this source of age information.

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