# SUBJECTIVE AGE BIASES AMONG ADOLESCENT GIRLS

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## ABSTRACT

Until now, the concept of subjective age has only been used to segment the mature market. Research on consumer behavior has shown the effects of a youthful bias, the tendency to see oneself as younger. Using a conceptual framework based on self-concept, social comparison, and symbolic consumption, this research proposes to characterize the antecedents and the effects of an analogous but opposed tendency: an older bias among adolescent girls. An empirical study carried out in France showed the influence of this tendency on makeup color preferences. These can convey the symbols of an identity age. The results also highlight the role of some antecedents of the older bias: aspiration to aging, self-esteem and concern for physical appearance.

## INTRODUCTION

The concept of subjective age was introduced in marketing to palliate the limits of chronological, or real age as a variable for segmenting seniors' markets. A substantial body of research on people over 50 (Wolfe, 1992; Moschis, 1994) has emphasized how little pertinence chronological age has. As an alternative, research suggests studying the influence of the subjective dimension of age which complements chronological age insofar as it characterizes the way in which a person experiences his own age. Subjective age was conceptualized as a manifestation of a self-image defense and was initially defined as "the individual's self-perception in terms of reference

age groups." (Blau, 1956). The study of the effects of the youthful bias involved interesting applications in the consumption of clothing, financial services, and tourism (Wilkes, 1992; Dunne and Turley, 1997; Cleaver and Muller, 1998). Research into consumer behavior, however, was limited to studying the manifestations of subjective age among seniors. Yet the same conceptual bases, particularly Self theories and theories of social comparison, make it possible to broaden the scope of study to include adolescence.

Adolescence, or the transition between childhood and adulthood, is considered a critical period for an individual's physical and social development (Erikson, 1969). An older bias, or the tendency to see oneself as older than one's age, which is comparable to the opposite tendency of seniors, can also be demonstrated at this point in an individual's life when the body is changing and an identity being sought. This is particularly true for individuals who feel the need to affirm themselves socially (Montepare and Lachman, 1989).

After having clarified the concept of subjective age, this research proposes to describe the older bias among adolescent girls, which is designed to defend the elements of self linked to age, by analyzing its antecedents and effects on consumer behavior.

## THE CONCEPTUAL FRAMEWORK

Barak and Schiffman introduced the concept of subjective age in marketing in 1981, using hypotheses drawn from the cognitive theory of aging (Thomas, 1970). Different frameworks proposed by research led to the development of many measuring tools, probably as a consequence of the variety of approaches developed in gerontology and in developmental psychology (Van Auken and Barry, 1995). In the broadest sense, subjective age includes all cognitive and affective representations associated with age and with aging (Gana, 1995).

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Consumer behavior defines this in the narrowest sense as cognitive age, or self-perceived age, a component of self-concept.

Barak and Schiffman (1981) proposed a scale for cognitive age. This scale and the gap between chronological and cognitive age, can be used interchangeably to measure the same concept (Chua, Cote and Leong, 1990; Hubley and Hultsch, 1994; Johnson, 1995). The first measurement lets us characterize the age to which individuals identify, and the second determines the direction and the size of the subjective age bias, the tendency to see oneself as either older or younger than one's chronological age (Steitz and McClary, 1985, 1988; Staats, 1996). This ambiguity has managerial repercussions: should consumption differences be characterized on the basis of cognitive age, or on the basis of the subjective age bias? We have several reasons for preferring the second approach. Conceptually speaking, the self-discrepancy theory (Higgins, 1987, 1989) states that the difference between the objective self and the subjective self influence behavior more than any single element. Moschis (1994) concurs, suggesting that the gap between chronological and cognitive age influences the consumption of products destined to defend self-image because of the self-consistency motive. Practically speaking, cognitive age taken alone does not allow us to identify the presence or absence of an eventual gap between chronological and cognitive age. The correlation coefficients between these two variables, observed in female populations between 20 and 90 years of age, are between .75 and .90 (Barak and Stern, 1985; Henderson, Goldsmith, and Flynn, 1995). These coefficients let us suppose a lack of discriminant validity of cognitive age because of the strong relationship. One explanation is the higher proportion of individuals between 20 and 50 years of age with no age bias, for whom cognitive age is the same as chronological age. (Barak and Gould, 1985; Goldsmith and Heiens, 1992).

This proportion seems to be much smaller among adolescents, many of whom reveal an older bias (Montepare and Lachman, 1989).

**The Antecedent Variables of the Older Bias Among Adolescent Girls**

Heckhausen and Krueger (1993) claim that normative conceptions of human development cause the gap between chronological and subjective age. These normative conceptions are temporal references that allow an individual to evaluate his or her position in terms of physical and social development, and future prospects with respect to life cycle. They include two types of interdependent cognition: those linked to the self and those linked to others. For self-evaluation, these norms use comparison mechanisms (Festinger, 1954) and reference groups are therefore extremely important. A considerable amount of research has shown that age constitutes an identifiable reference group. A person belongs or wants to belong to an age group, is affected by a group or sees the group is an ideal insofar as it is a means of social categorization (Montepare and Zebrowitz, 1998). Age is also the subject of labeling due to associated social roles and stereotypes (Tepper, 1994 ; Alaphilippe et Bailly, 1997).

Subjective age bias concepts fall into the life-span theory of control developed by Heckhausen and Shulz (1995). Age biases are defined as the manifestation of a compensatory regulation process of self elements linked to age. Heckhausen and Shulz underlined the importance of social comparison mechanisms in the regulation process. This process results in a confrontation between an individual's questioning of his identity and his idea of others' views of normal human development. From this confrontation he sets developmental aspirations. These are feelings, expectations or beliefs about his own physical, psychological and social development. Depending on the degree of difference between these elements and evocations associated with chronological age, a difference between chronological age and subjective age is likely to be revealed. If there is no difference in these elements, individuals tend to show no age bias.

Developmental aspirations can be considered as one of the main factors determining subjective age biases. As the manifestation of "upward" social comparison with the purpose of self-improvement, the older bias of adolescents can be defined as the degree of their desire to access physical and social maturity which they see as valorizing.

As Martin and Kennedy (1993) and Martin and Gentry (1997) point out, when the referent is stimulating, this kind of comparison makes it possible to reach the goal of self-improvement. Proximity to an inspiring person thus becomes a source of valorization. Alaphilippe and Bailly (1997) suggested that, for an adolescent, the most satisfying comparaison referent might be the subject himself idealized a few years in the future. We can suppose, therefore, that the stronger the aspiration to aging among adolescent girls, the greater the older bias.

Self theories concerning adolescents show that some elements are more salient than others because of the transition from childhood to adulthood (Rosenberg, 1964; Oubrayrie, de Leonardis, and Safont, 1994). The future self, social self and physical self are interdependent. The desire for social recognition with age should depend on an individual's self-esteem and the self elements tied to physical appearance. Recently published research in developmental psychology and consumer behavior suggest that when there is negative self-esteem, the defense process and the process of improved self-image are more likely to be activated (Brandtstadter, 1989). These mechanisms should strengthen the aspiration to aging when self-esteem is lower.

During the transitional phase to adolescence, the physical self is determinant. This is a time when the body is changing quickly, and is most often perceived as incomplete. Adolescence is also a stage in life when the search for identification and comparison with opinion leaders is very

strong. Richins (1991) claims that individuals who consider physical appearance to be important are inclined to improve their image in a context of social comparison. Yet the possibilities for physical self-improvement depend on ideal beauty standards (Vacker and Key, 1993), born by models whose apparent age is somewhere in the 20s and therefore older than adolescents. For self-improvement, we shall suppose that the more an adolescent girl is concerned by physical appearance, the more she will aspire to be older.

**The Influence of Age on the Symbolic Use of makeup**

Subjective age biases, as manifestations of a compensatory regulation process of self-image, should influence products that are likely to consolidate or heighten the elements of self-concept linked to age. This can be explained by theories on congruence and symbolic interactionism. The former stipulates that a consumer prefers a product or a brand whose image is in conformity with his/her concept of self (Sirgy, 1982). Generally speaking, products with a strong sign-value allow the consumer to pursue these goals because of the social visibility of their consumption. Certain products convey individual or social symbols and their acquisition can be culturally imposed in a society, or depend on fashion.

Symbolic interactionism using the concept of Compensatory Symbolism links knowledge of roles and consumption. From this viewpoint, using symbolic products enables one to establish one's social placement (Solomon, 1983). It is well adapted to adolescent girls wishing to reach the social status of older women. The result of this desire is to adopt symbols portrayed by products used by adolescents' reference age groups.

In order to demonstrate how age affects symbolic consumption, details must be given on the way a product's attributes convey symbols that characterize an identity age to which the consumer identifies. The authors of the functional theory of attitudes towards objects have demonstrated

that product attributes can be expressive because they constitute a visual language that conveys information about self (Smith, Bruner and White, 1956). Several researchers have suggested a youthful vs. older nature of product attributes. Brand personality and dress styles in particular evoke this specific dimension of objects (Aaker, 1997). Damhorst and Reed (1986) and Francis and Evans (1987) demonstrated how the symbolic properties of clothing color influence perception. Liebman (1987, 1989), and later Eckman *et al.* (1990) demonstrated a relationship between age and clothing color preferences. More generally, all of this research suggests that product colors can be a means of managing others' impressions.

Color, as a visible product attribute, seems to be able to evoke an identity age or an age reference group (Reynolds and Darden, 1972; Barak and Gould, 1985; Marion, 1992). It is nonetheless difficult to isolate the real impact of a color from the impact of other product attributes. In order to test the influence of subjective age on symbolic consumption, we have chosen to examine makeup, for two basic reasons. First, the social character of the use of makeup allows individuals to improve their looks and their impact on others. Makeup therefore satisfies the imperatives of defending one's image, with respect to others and to oneself, and is a means of valorizing or consolidating an individual's self. Makeup can also compensate for negative self-esteem (Cash and Cash, 1982 ; Miller and Cox, 1982).

The visible attributes of lipstick are the second reason for choosing this product category. There are only so many makeup products and some of them are limited exclusively to color (lipstick, nail polish). In this case, the possibilities for symbolic use are limited to the color's expressiveness. We suggest that the effect of chronological age and of the subjective age biases

can be determined by preferences shown for lipstick shades because lipstick shades are highly visible and their use changes over time.[2]

The concept of a makeup career suggests how subjective age biases influence the symbolic use of makeup (Cash, 1987; Bloch and Richins, 1992; Fabricant and Gould, 1993). A makeup career designates an individual's lifelong experiments with makeup, and is interesting for three reasons in terms of the issues being studied here. First, the temporal perspective of makeup use is made clear because of its usage tied to the construction of individual identity and to transitions that characterize the passage from one phase of life to another (Hareven and Masaoka, 1988; Schouten, 1991). This perspective seems to be adequate to the objective and subjective roles of age as a temporal marker in an individual's personal and family life.

Initially suggested by Goffman (1959), products are a means of expression. In the light of this, the concept of a makeup career emphasizes makeup's ability to allow the same individual to fulfill a range of different social roles. The possibilities for using makeup allows users to promote, define, imagine and even create different social roles and to project different images of themselves depending on the situation (Rook, 1985).

Third, Fabricant and Gould (1993) have suggested that makeup colors convey characteristic symbols of an identity age. They emphasize the degree of adequacy between a color and an individual's age. These authors claim that adolescent girls go through a makeup apprenticeship during which they use natural, earth-tone colors whose perceived social risk is lower than brighter colors. Adolescent girls perceive earthy colors as more appropriate to their age but as adult women, they use brighter colors. These colors allow them to affirm the different social roles they play as individuals, and therefore strengthen their identity.

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[2] Lipstick, in French is "rouge à lèvres" meaning literally 'red for the lips.' The color red, is therefore, already evoked

We therefore hypothesize that the color of makeup products carries an age-sign value defined as a communication code for an identity or for the characteristic symbols of a cohort or cohort group. The term *code* designates all the shared knowledge in a communication message between the sender and receiver, such that the sender can express an identity age and the receiver can understand the message (McCracken and Roth, 1989). As for the hypotheses of linguistic and non-linguistic communication theoreticians (Schatzman and Strauss, 1955; Bernstein, 1974), we assume that this code is not universally known. By contrast, we believe that the majority of individuals within the same cohort group recognize it. For this reason, the concept of a makeup career explicitly suggests a link between chronological age and color preferences as a function of associated age symbols. We can also assume a similar link between the older bias of adolescent girls. Makeup products allow them to promote certain social roles associated with age which are defined by activity, interests, and physical appearance -- those elements that characterize the different facets of subjective age (Kastenbaum *et al.*, 1972). Fabricant and Gould (1993) claim that the selective use of certain colors makes it possible to consolidate the feeling or desire to appear older or younger. When a social situation requires a symbolic use linked to age, the individual examines the available product colors and compares the age-sign value of each with the identity age that she hopes to project. When this value is interpreted as being consonant (adolescent vs. mature) with the subjective age bias (youthful or older) the individual senses a coherence between the bias and a color. An individual's expression of this through color preferences, should depend on the degree of congruence. The subjective age bias will only influence preferences as a function of a color's age sign value.

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when a French person speaks of lipstick.

Many of Sirgy's research projects (1981, 1982, 1985) have shown that different facets of self could work together to influence product preferences and the intention to buy or try it. All of these developments lead us to suppose a cumulative effect of chronological age and of the older bias among adolescent girls on color preferences with a mature age sign value. In other words, the preference for these colors is stronger when chronological age and the older bias increase simultaneously.

Moreover, Cash and Cash (1982) demonstrated a negative link between self-esteem and the frequency with which makeup products are used. The supposed cumulative effect should be stronger among regular makeup product users. Their higher rate of consumption could reflect a greater need for affirming an age identity through the intermediary of lipstick colors because of poor self-esteem. We shall therefore suppose that the degree of lipstick usage moderates the relationship between the subjective age biases and color preferences.

## METHODOLOGY

**Sampling Procedure**[3]

After several preliminary studies, a self-administered questionnaire was distributed to a sample of 213 lipstick users. These adolescents, between 12 and 18 years old (average age=15.62), attended either a junior or senior high school in the Paris area and live at home.[4]

**Measurements of Subjective Age Biases and their Antecedents**

*Subjective age bias scores* were obtained by computing the discrepancies expressed in years between chronological age and each of the items of the two subjective age scales: cognitive age and desired age.

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[3] During the qualitative phase of this research, it became clear that young colored girls use specific makeup products. For this reason, they have not been included in the sample.

[4] The scales used here were developed in the United States. They were translated and validated in order to adapt them to a French socio-cultural context. The French wording of the items may be obtained from the author.

Barak and Schiffman (1981), and Barak, Stern & Gould (1988) have developed these scales on the basis of the four supposed facets of subjective age. These are feel-age, look-age, do-age, and interests-age (Kastenbaum *et al*. 1972). The uni-dimensional structure of the cognitive age scale has been established on several occasions (Wilkes, 1992; Van Auken and Barry, 1995). It has also been successfully used on individuals of different cohort groups in a French social-cultural context (Gana, 1995; Guiot, 1996, 1999). Adapted from this measure, the scale of desired age is used to measure ideal age-role self-concept (the age that an individual would like to be). It was chosen because of its relevance to this research, given the importance of the future self for adolescents. The two scales of subjective age were administered at the end of the questionnaire.

*Self-esteem* was measured using Harter's (1988) *Self-Perception Profile* specific scale for adolescents. The scale includes items whose format was designed to minimize the phenomenon of social desirability because this is a sensitive part of the survey for adolescent girls. Martin and Kennedy (1993) validated this scale.

*The aspiration to aging measure* was designed by adapting a scale for measuring the tendency to social comparison that Martin and Kennedy (1994) proposed using Harter's format. It is also justified because of the entirely marginal proportion of adolescent girls who show a youthful bias. Only 0.5 % and 3.8% of a pre-test sample of adolescent girls (N = 111) showed, respectively, youthful desired or cognitive biases.

Finally, the scale of *concern for physical appearance* (Likert in 7 points) follows from Netemeyer *et al*. (1995). Examples of items designed to measure antecedents of the subjective age biases are presented in table 1. These scales were administered after collecting the data relevant to the preferences that we are presenting here.


**TABLE 1** - *Sample Items*

**RATIO SCALES:**

•*Cognitive Age (4 items)*

I feel as though I were _____ years old.

•*Desired Age (4 items)*

I would like to look as though I were_____ years old.

**SCALES USING THE HARTER FORMAT:**

| Really True for Me | Sort of True for me | ASPIRATION TO AGING *(3 ITEMS)* | | | Sort of True for me | Really True for me |
|---|---|---|---|---|---|---|
| | | Some teenagers would like to be seen as adults. | BUT | Other teenagers prefer to be considered adolescents | | |
| | | Self-Esteem (3 items) | | | | |
| | | Some teenagers are happy with themselves most of the time | BUT | Other teenagers are often not happy with themselves | | |

**LIKERT SCALE:**

•*Concern for Physical Appearance (4 items)*
The way I look is extremely important to me

**Stimuli and Measurements of Lipstick Color Preferences**

To test the hypotheses about the symbolic use of makeup products, we included 'generic' lipstick colors in the questionnaire after several preliminary studies. These colors have characteristic combinations of hue, brightness, and saturation corresponding to stable market expectations (Drugeon-Lichtlé, 1996). Four leading brand executives were interviewed to understand the principal color classifications used for the French market. These are based on eight basic color families: reds, pinks, orange tones, browns, beiges, pinky-beiges, fuchsias, and violets. Within each color category, the two criteria of brilliance (mat vs. satiny colors) and a generic quality

(classical vs. seasonal or fashionable) are used to classify references. Our study only dealt with generic and mat colors so as to eliminate variations tied to period and brilliance which correspond to particular expectations for each basic shade. Next, we wanted to select a representative reference for each color family. Using market segment statistics for lipstick at the leading French cosmetics chain, Sephora[5] 19 models were pre-selected from about 400 references from the Fall 1998 collection. The choices depended on three conditions. First, the color had to have been included in at least four prior collections so as to be considered a generic color; next, it had to be classified as a mat color; and, finally, it had to be a bestseller of a color family to correspond to a specific and stable market expectation. Using a pre-test involving 8 adolescent girls, and after having verified how representative each color was of the basic shade, we chose 9 colors for the final questionnaire (2 reds, including one Bordeaux, 1 orange tone, 1 brown, 1 beige, 1 pink, 1 pinky-beige, 1 fuchsia, 1 violet). A professional photographer shot the colors to ensure that they were reproduced exactly and under identical conditions (same angle, same background) for each of the 9 choices. Once this had been done, the color shots were numerically scanned and reproduced using Photoshop, then inserted into the questionnaire for the final survey (no color names were mentioned). The visuals were presented to each respondent in a random order, using a table of random numbers, to avoid any effect of presentation order.

Much research has shown that the use of cosmetic products varies with the situation (Cash, 1982, 1987). We asked our respondents to express their color preferences with respect to a social context ("*You are going to an important party at your friend's house. You decide to put on makeup and choose a lipstick color that makes you as attractive as possible.*") This was done in two stages. First, by using Cash and Cash's (1982) circumstantial inventory of cosmetic products

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[5]Sephora's data can be considered representative of the French market. Its range includes mass market and selective brands.

use in addition to two other situations[6] administered in a pre-test (N = 111). The 10 characteristic inventory situations were thus broadened, and presented. We asked interviewees to tell us, for each of these, which situation could induce an older bias. Of the adolescents we interviewed, 53.1% claimed that they wanted to appear older at a party. A qualitative phase of the research allowed us to specify two other dimensions of a given situation that correspond to Belk's research (1974): the social context (the friends) and the mood (the evening is considered important). In the final questionnaire, two preference indicators were used after describing the context in which the lipstick was worn. First, we asked the respondent to classify the visuals of the 9 colors by preference (preferred color ranked no. 1) and then to express the intention of trying it by using the Likert 7-point scale (7 corresponding to maximal intention). To make research results easier to understand, color rankings were recoded in reverse order. One general composite measurement of preferences was built using these two variables because of their high correlation. A measure of the degree of lipstick usage was adapted from the Cash and Cash (1982) cosmetic use inventory.

The qualitative phase of the research also enabled us to generate a measure of the age sign value of colors[7] whose visuals were presented a second time in a different order. For each color, one statement was then formulated using a semantic differential tagged with adolescent girl vs. mature woman polarities, separated by 7 points (example: "If I were to wear color A, I would feel like I look like an adolescent girl" /"If I were to wear color A, I would feel like I look like a mature woman"). In the initial instructions for this part of the questionnaire, respondents were told that they could not answer if the color was perceived as having nothing to do with a reference age, and simply check a square next to one of the differential polarities.

## RESULTS

**Construct Validation**

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[6] Taken from an exploratory study.

Initially, measurements of cognitive and desired age were validated on a specific population of French adolescent girls. An exploratory analysis of all eight subjective age items on an initial sample (N=111) let us identify a factorial structure corresponding to the 2 assumed dimensions. The factorial analysis (oblimin rotation) let us restore 78.7% of the variance, explained with the 2 correlated factors (r=0.53) with eigenvalues higher than 1 and where each of the items strongly load their original factor (loadings mean= 0.81). The reliability of cognitive and ideal age scales are satisfactory ($\alpha$=0.87 and $\alpha$=0.89 respectively). Then, a confirmatory model (EQS 5.7) was established for the final data (N=213). The estimation was carried out by the maximum likelihood method with robust statistics given the non-multinormality of the data (critical Mardia ratio = 48.997). The fit was satisfactory (Satorra-Bentler $\chi^2$=22.327; p=0.268; robust CFI=0.996; AGFI=0.923; RMSEA=0.064). Loadings varied from 0.677 to 0.929 with an average of 0.855. The factors are correlated (r = 0.64).

Next, two variables corresponding to cognitive and ideal age biases were built by calculating the difference between chronological age and each of the items of the cognitive and desired age scales. Differences ranged from -5.00 to 1.17 for the cognitive age bias, with an average of -1.02. Those for the desired age bias fell between -13.25 and 1.75, with an average of -2.91. However, these statistics cannot be directly compared to those for seniors who have a different perception of a year's time (Montepare and Lachman, 1989). In a complete model of structural equations, the reliability of the two new variables obtained was estimated by calculating Joreskorg's rho ($\rho$=0.79 and $\rho$=0.77 respectively). The composite reliability coefficients of the other constructs varied between 0.76 and 0.80. Only the self-esteem scale showed slightly less reliability than the

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[7] This measure had been tested for reliability test-retest in a preliminary study with satisfactory results.

other measurements ($\rho$=0.67). The convergent and discriminant validities of the constructs were verified using the method proposed by Fornell and Larker (1981).

**Testing the Causal Model**

Our approach proposes a test for a complete model that makes it possible to explain lipstick color preferences among adolescent girls using the subjective age biases and their antecedents. To do this, we made an initial classification of colors using their age-sign values. To distinguish colors with an "adolescent" age sign value from those with a "mature" age-sign value, we carried out a one sample T test allowing us to verify whether the average of the age-sign values for each color differed from the midpoint of the graduated scale from 1 to 7, e.g. 4. Table 2 summarizes, for each color, the number of individuals giving it an age-sign value, the level of significance of test t, the sign of the difference between the average of the age-sign value and the midpoint of the scale.

**TABLE 2** - *Age-Sign Value of Lipstick Colors*

| ONE SAMPLE T TEST: Test Value = 4 | | | | | |
|---|---|---|---|---|---|
| | | N | T | Sig (bilateral) | Average Difference |
| | Pinky-Beige | 192 | 3.868 | 0.000 | 0.427 |
| | Pink | 190 | -1.354 | 0.177 | -0.2211 |
| | Red | 194 | 13.714 | 0.000 | 1.4381 |
| | Beige | 195 | -9.776 | 0.000 | -1.1795 |
| | Orange tone | 176 | -2.537 | 0.012 | -0.4261 |
| | Brown | 207 | -5.750 | 0.000 | -0.7681 |
| | Fuchsia | 186 | 9.382 | 0.000 | 1.1613 |
| | Violet | 195 | -6.077 | 0.000 | -0.7857 |
| | Bordeaux | 197 | 1.889 | 0.06 | 0.2437 |

Colors were classified into three categories using the indicators from Table 2. The first category included colors with a mean age-sign value for which the differences were not significant at the 0.05 threshold: pink and Bordeaux. The two others let us distinguish colors "conveying the

adolescent girl image" with an average value of less than 4 (beige, orange tone, brown, violet), from those "conveying the mature woman image" with an average value higher than 4: pinky-beige, red, fuchsia.

We have only identified the non-significant or marginal intensity relations ($R^2 < 3\%$) between the different age variables and the color preferences for the color groups with an adolescent or mean age-sign value. We shall only describe the significant results of the final model concerning colors with the age sign value of "mature woman" due to space restrictions.

Our hypotheses were tested using a structural equation model estimated with the help of partial least squares (PLS) estimation, an approach first developed by Wold (1973), then Lohmöller (1989). We preferred this method to a classical analysis of covariance structures for several reasons. First the PLS approach is particularly well suited to the basic analysis of heterogeneous data because of the different types of variables (particularly nominals and ordinals) and the measurement formats associated with them. Collecting data relative to preferences (ranks), subjective age bias (ratio scales), self-esteem (scale using Harter format) and other constructs evaluated using the Likert scales makes the estimation difficult because of the maximum of likelihood properties. This one is based on hypotheses of multinormality and of sufficient sample sizes. Some of our variables showed a non-multinormal distribution (subjective age biases). Moreover, the test of a moderator effect of the degree of use required an analysis of both regular and occasional user groups. The first group sample was too small to use a LISREL type model without biasing the estimation of the parameters. Finally, testing for a cumulative effect of cognitive and ideal age biases on preferences could have been compromised by the multicollinearity among variables. Several authors have shown that the PLS method correctly manages constraints (Fornell and Bookstein, 1982; Wellhofer, 1985; Falk and Miller, 1992).

The hypotheses about antecedents were initially tested in a model for which the overall R2[8] was 18.0% in the total sample. Next, all hypotheses were tested using a complete model presented in Figure 1 (overall $R^2$=11.1%) on a sub-sample[9] of all individuals having simultaneously attributed an age sign value to all colors (82.2% of the entire sample). For space reasons, we will only report the results for the complete model. The significance of the relations was verified with a cross validation using the jackknife method in the LVPLS 1.8 program. In order to make the results easier to read, Figure 1 reports only the significant relations.
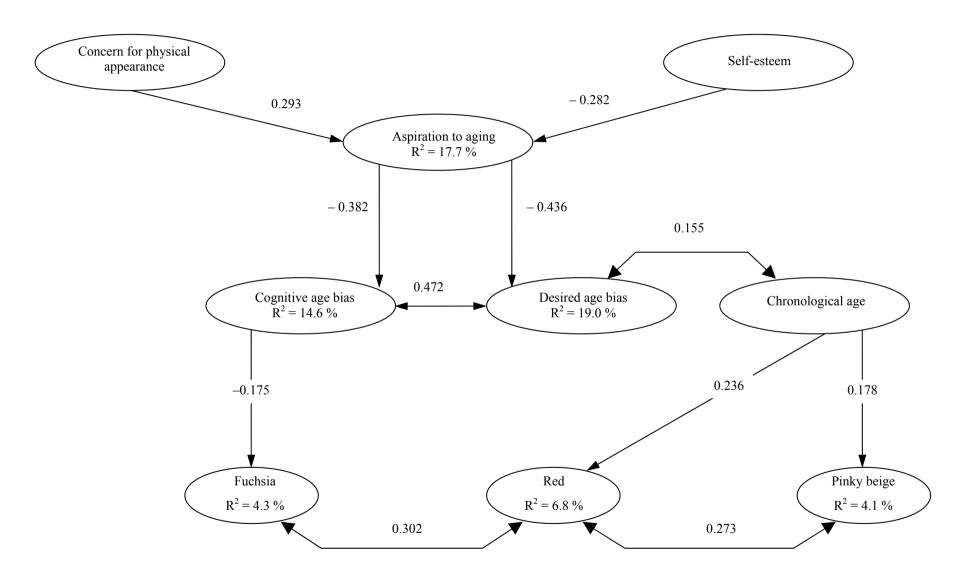
The aspiration to aging seems to be induced by negative self-esteem (B= -0.282) and by the concern for physical appearance (B=0.293). These two constructs explain 17.7% of the variance in aspiration to aging which seems to be an important antecedent variable of cognitive and ideal age biases, with 14.6% and 19% of explained variance, respectively. The greater the aspiration to aging, the higher the cognitive and ideal elderly older biases (with B= -0.382 and B= -0.436 respectively). The signs of standardized path coefficients associated with these relations are negative insofar as the characteristically adolescent older bias translates into a subjective age that is greater than chronological age. The chronological-subjective age discrepancy is then negative. The test of the hypotheses shows that chronological age and the subjective age biases are insufficient predictors of preferences for fuchsia, red, and pinky-beige in the total sample (average $R^2$=5.1%). All the same, we observe that preferences for red (B=0.236) and pinky-beige (B=0.178) increase with chronological age.

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[8] For PLS, the R² is an appropriate measure of overall fit. Additionnaly, the estimated deviation correlation matrix can also be used to address overall fit. This analysis also indicates overall fit to be appropriate. The letter B in LVPLS designates a standardized path coefficient.
[9] No differences of age sign value were observed in the sub-sample.

**Figure 1.** - *Determinants and Effects of Subjective Age Biases on Lipstick Color Preferences with Mature Age Sign Value (N = 175)*

- Concern for physical appearance
- Self-esteem
- 0.293
- − 0.282
- Aspiration to aging $R^2 = 17.7$ %
- − 0.382
- − 0.436
- 0.155
- Cognitive age bias $R^2 = 14.6$ %
- 0.472
- Desired age bias $R^2 = 19.0$ %
- Chronological age
- −0.175
- 0.236
- 0.178
- Fuchsia $R^2 = 4.3$ %
- Red $R^2 = 6.8$ %
- Pinky beige $R^2 = 4.1$ %
- 0.302
- 0.273

These results could, however, mask the supposed moderator effect of the degree of lipstick use. Using Cash and Cash's measure, 121 adolescent girls defined themselves to be occasional users while 54 others considered themselves to be regular users. Table 3 shows the role of this variable. Comparing the effects of age variables on preferences among occasional and regular users shows a very weak influence on age variables in the first case, whereas the impact of chronological age and subjective age biases are strong in the second case. These results suggest that the degree of lipstick use plays a moderating role. In addition, a cumulative effect of different age variables was tested using a series of hierarchical models in which chronological age was systematically introduced first to control its action independently from that of the subjective age biases. Then, these biases were progressively included.

**TABLE 3** - *Effects of age variables on preferences for colors with the mature age sign value: Multiple $R^2$ for occasional users vs. regular users*

| | Occasional Users N = 121 Preferences ($R^2$) | | | Regular Users N = 54 Preferences ($R^2$) | | |
|---|---|---|---|---|---|---|
| | *Pinky Beige* | *Red* | *Fuchsia* | *Pinky Beige* | *Red* | *Fuchsia* |
| M1: Chronological age | 3 % | 2.3 % | 0.2 % | 5.0 % | 28.7 % | 6 % |
| M2: Chronological age + CAB | 3 % | 2.6 % | 2 % | 8.7 %* | 37.6 %* | 29 %* |
| M3: Chronological age + DAB | 3 % | 3 % | 1.3 % | 6 % | 36.6 %* | 8.9 %* |
| M4: Chronological age + CAB + DAB | 3 % | 2.9 % | 2.1 % | 9 % | 40.8 %** | 28.9 % |

CAB: Cognitive Age Bias is the discrepancy between chronological age and cognitive age.
DAB: Desired Age Bias is the discrepancy between chronological age and desired age.
  * Significant increase in models 2 or 3 with respect to model 1.
** Significant increase in model 4 with respect to models 2 or 3.
    M1 to M4: hierarchical models 1 to 4.

An increment test (Harris, 1985) that is compatible with the PLS method let us verify the cumulative effect of chronological age and of older biases on preferences for pinky-beige, red and fuchsia among regular users. However, we should emphasize that the cognitive age bias is a better predictor than chronological age for the preference for fuchsia with 20.2% of explained variance when it is introduced as the sole predictor. Conversely, chronological age is a better predictor than the subjective age biases for preferences for red and pinky- beige with, respectively, 28.7% and 5.0% explained variance.

## RESEARCH LIMITS AND EXTENSIONS

Our results cannot be generalized to all lipstick color references characterized by a specific combination of hue, brightness and saturation. Nonetheless, these results suggest the role of the subjective age biases on the formation of product preferences with an age sign value. Moreover, the effects have only been brought to light in a single use context (a party). It would be desirable, in future research, to study the influence of age variables by comparing the effects in different use situations.

Current consumer behavior studies attempt to demonstrate the interest of the subjective age concept for a single group: seniors. The results of our study lead us to propose an extension of the field of application to include female adolescent consumers insofar as the subjective age biases seem to be a consequence of their aspiration to aging.

Defined as a desire to be physically (and socially) mature, it would be useful to examine links between this concept with that of sexual identity (Bem, 1974). If the two aspects correlate, it would be possible to determine the attributes of common symbolism between these two components of identity so as to better target some characteristic adolescent segments.

Our results show a cumulative effect of chronological age and the older bias on makeup products color preferences among regular users. The ways in which the subjective age biases influence

consumer behavior have not been the subject of much research, which is why we propose to study the effects on those categories of products which might convey age symbols. To do so, comparative studies need to be made of products with different age-sign values.

The complementarity that has been established between chronological and subjective age variables suggests their dual use in a segmentation approach. Other studies should be carried out to confirm the influence of the elderly bias on the behavior of young consumers. More generally, it would be useful to compare the influence of the subjective age biases of seniors and of other cohort groups on the consumption of the same category of products in order to better understand the effects of age on behavior. Antecedent variables should also be more closely examined to improve prospection and even the loyalty of segments most likely to show these subjective age biases.

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