Acculturation and Cognitive Performance of Migrant Children in The Netherlands

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Acculturative strategies and cognitive acculturation were studied among 118 Dutch migrant children (age: 7–12 years). Both an exploratory factor analysis and a Linear Logistic Test Model analysis provided evidence for the bipolar unidimensionality of Berry's four acculturation strategies; integration constituted one pole and assimilation, separation, and marginalization the other. Integration was by far the most popular strategy. Cognitive performance was measured by the Snijders-Oomen Nonverbal Intelligence Test, school report measures, and a computer-assisted choice reaction-time measure. A good fit was found for a structural model that postulated cognitive acculturation as the latent variable linking back-ground measures (i.e. acculturation strategy, second language usage, age, and gender) to the cognitive measures. Relationships between background variables and cognitive performance were stronger in the first than in the second generation. Both older children and children who favour an integration strategy showed a higher degree of cognitive acculturation.

Cette étude analyse les stratégies d'acculturation et l'acculturation cognitive chez 118 enfants immigrants néerlandais (âge: 7–12 ans). Une analyse factorielle exploratoire et une analyse par le Linear Logistic Test Model appuient l'unidimensionnalité bipolaire des quatre stratégies d'acculturation proposées par Berry; l'intégration constitue l'un des pôles tandis que l'assimilation, la séparation et la marginalisation constituent l'autre pôle. L'intégration représente la stratégie qui est de loin la plus populaire. La performance cognitive est mesurée par le test d'intelligence non verbale Snijders-Oomen, par des mesures de performance scolaire et par une mesure de temps de choix dans une tâche assistée par ordinateur. Les données correspondent bien à un modèle structural selon lequel l'acculturation cognitive serait la variable latente reliant les mesures de base (i.e. stratégie d'acculturation, utilisation d'une langue seconde, âge et sexe) et les mesures cognitives. Les relations entre les variables de base et la performance cognitive sont plus fortes chez le première que chez la deuxième génération d'immigrants. Les enfants plus âgés et les enfants qui favorisent une stratégie d'intégration montrent un plus fort degré d'acculturation cognitive.

Acculturation processes can be expected to affect various psychological domains of both children and adults. Yet most studies of psychological acculturation have involved adults; only a few have addressed acculturation by children. More-over, the consequences of acculturation have mainly been studied from a social-psychological and mental health perspective (e.g. Schmitz, 1994; Ward & Kennedy, 1993), and cognitive aspects of acculturation have received scant attention. The present study addresses acculturation and its cognitive consequences among Dutch migrant children.

Various authors have proposed classifications of acculturation strategies. A currently popular scheme has been presented by Berry (1980; Berry & Sam, 1997), who proposes four possible accul-turation strategies. An individual's strategy depends on her/his attitude toward (or identifica-tion with) the original and main culture. A

positive regard for both cultures is called *integration*. A positive attitude toward the main culture combined with low identification with the original culture results in *assimilation*. The rejection of both cultures results in *marginalization*. A positive attitude toward the original culture combined with a negative attitude toward the main culture comprises the *separation* strategy. Other models have been described by, among others, Baldauf (1976), Boski (1994), and Mendoza and Martinez (1981).

The dimensionality of acculturation has been the focus of much debate in cross-cultural psychology and anthropology. Historically, there is a shift from a unidimensional to a bidimensional concept (e.g. Berry, 1998; Bourhis, Moïse, Perreault, & Senécal, 1997; Marin & Gamba, 1996; Szapozcnik, Kurtines, & Fernandez, 1980; Zhou, 1997). Unidimensional models view acculturation as the transition from original to mainstream culture (e.g. Gordon, 1964). In bidimensional models, such as Berry's, attitudes toward the native and main culture are seen as independent (at least in principle). Because the present study uses Berry's framework, we are particularly interested in the dimensionality of the four strategies. In our view, either a one-factorial or a two-factorial solution may be found in a factor analysis of the four strategies; in a recent paper, Berry (1998) presents a model of dimensionality of acculturation strategies that is similar to ours. The most elaborate solution is formed by two bipolar factors. For instance, integration and assimilation constitute the first factor, and separation and marginalization the second. A fully fledged two-factorial, bipolar solution is obtained only if all strategies constitute viable options for the acculturating group. It is likely that for various groups the two underlying dimensions (i.e. desirability of positive relations with the native and main groups) do not constitute realistic choices. Thus, if an acculturating group is small and the main society exerts pressure on the group to assimilate (the ''melting pot''), then separation is not a realistic option. In general, pressure by the main society or the cultural group can limit the choices of the acculturating individual. Due to a restriction of choices, poles or factors may merge. Two amalgamated strategies may constitute a unipolar factor in a two-factorial solution. For example, separation and marginalization may merge when the most important choice is between assimilation and integration (constituting the first factor) and the distinction between separation and marginalization is immaterial; that is, both are consistently either preferred (pointing to resistance to adjust to the main culture) or not preferred (pointing to a willingness to adjust). The positive correlation between separation and marginalization will merge these into a single pole. This merging process may happen when the own group is small or strong pressure to adjust is exerted by the main culture.

It is also possible that the two factors merge. As an example, suppose that one strategy (e.g. separation) is preferred by the vast majority of the acculturating group. The correlations between the strategies will mainly be determined by the majority (who have high scores on separation and low scores on all others) and a small minority that has a lower score on separation and a mixed pattern of high and low scores on the others. As a consequence, there will be a strong negative correlation between separation and the other strategies whereas the latter will show positive correlations. In a factor analysis this pattern of correlations will show up as a single, bipolar factor.

Groups that strongly prefer a particular strategy will show one of two solutions. A unifactorial, bipolar solution may be observed, blending three strategies into one pole while the fourth strategy defines the other pole. In Gordon's (1964) assimilation model, such a factor would have assimilation at one end and the three other strategies at the other. In Berry's model, each of the four strategies may define one pole. A single dimension with two strategies at each end may also be obtained. Such a solution can be expected when the two theoretically possible questions (i.e. relationship with the native and with the main culture) are reduced in practice to a single question. This may happen when all individuals choose the same option on one of the questions; for example, separation and integration may constitute one pole (defining the positive attitudes toward the native culture) and assimilation and marginalization the other (defining the opposite choice).

It can be concluded that the two-by-two scheme in which the strategies are usually displayed (e.g. Berry, 1980, 1998) cannot simply be translated into a bipolar, bidimensional factor-analytic solution. It should be emphasized that various factor-analytic solutions are in line with Berry's model. However, some solutions would falsify the model. First, the extraction of more than two factors would never be needed (note

that we refer here to analyses of scale scores and not item scores). Second, factor analytic solutions in which either the combination of integration–marginalization constitutes one pole and assimilation, separation, or both the second pole would falsify the model. Analogously, factors with assimilation and separation at one end and integration, marginalization, or both at the other are not allowed. A first aim of the present study is the examination of the dimensionality of acculturation strategies in a group of migrant children in the Netherlands.

An important topic in acculturation research involves a comparison of strategies across generations. It is well documented in the literature that acculturation is a process that can last several generations. For obvious reasons, most empirical research of intergenerational differences has dealt with a comparison of the first and second generation. The most recurrent changes between these generations are a reduction of acculturative stress (e.g. Padilla, Wagatsuma, & Lindholm, 1985; Richman, Gaviria, Flaherty, & Birz, 1987) and psychological changes toward the main society (e.g. Buriel, 1993). More specifically, from the first to the second generation, developments in the direction of the main culture have been observed for locus of control (Padilla et al., 1985), field independence (Knight, Kagan, Nelson, & Gumbiner, 1978; Saracho, 1983), values (Feldman, Mont-Reynaud, & Rosenthal, 1992; Georgas, Berry, Shaw, Christakopoulou, & Mylonas, 1996; Rosenthal & Feldman, 1990), and adherence to the main culture (Mavreas, Bebbington, & Der, 1989). Moreover, Knight et al. (1978) report an increase in reading and mathematics achievement in school from the first to the second generation. Buriel (1975), studying three generations of Hispanics, found that the third generation was the most field independent, followed by the first and second generation. The overall picture points to acculturation as a development toward the main culture, accompanied by either maintenance or loss of the original culture. This picture is an oversimplification. It does not take into account various factors that can influence the acculturation outcome in a pervasive way, such as the resourcefulness of the native and main cultures for the acculturating individual (e.g. access to schooling, the labour market, and institutions of the own and main group). Moreover, it does not do justice to the substantial individual differences in acculturation strategies and outcomes. The examination of intergenera-

tional differences in acculturation styles is a second aim of the present study.

The relationship between acculturation strategy and cognitive test performance has been examined in only a few studies. Inkeles and Smith (1974) found that modernity (in Berry's terminology closest to assimilation), shows a strong, positive relation to formal education. Similarly, Baldauf and Ayabe (1977), studying American Samoan adolescents, found a positive relationship between assimilation and Western high-school academic achievement. No relationships were found for other acculturation strategies.

Knight et al. (1978) investigated acculturation of second- and third-generation Mexican-American children at primary school age. They found that the latter group was more similar to Anglo-American norms with respect to reading and math achievement than the former group.

Berry, Wintrob, Sindell, and Mawhinney (1982) studied the psychological adaptation of James Bay Cree after the introduction of a hydroelectric dam in their territories. In addition to acculturation measures, the authors also administered Koh's Blocks, Raven's Matrices, and a vocabulary test. In a factor analysis the cognitive measures showed the strongest correlations with integration (positive) and marginalization (negative).

Recently Mishra, Sinha, and Berry (1996) investigated 210 adults in Bihar (India) living in various ecological environments ranging from hunting-gathering, through a blend of hunting-gathering and agriculture, to fully fledged agricultural means of subsistence. These ecocultural differences, as well as test and contact acculturation, were studied in relation to cognitive performances. Contact acculturation refers to the behavioural shifts, such as changes in perception and cognition, resulting from contact with other cultural groups (Berry, 1980). Test acculturation refers to the ease and comfort an individual feels in performing a cognitive task in a test situation in the presence of a tester. Individuals with better schooling felt more at ease responding to the test items. Both contact and test acculturation were positively related to cognitive task performance.

Berg and Kugelmass (1994) studied the cognitive development of Israeli Bedouin children from a Piagetian perspective. They found a significant effect for socioeconomic status (SES) but not for style of life (i.e. the extent to which an individual

moves toward permanent housing and a way of life similar to the surrounding dominant Israeli culture). Kendall, Verster, and Von Mollendorf (1988) quote various South African studies in which a rise of cognitive test scores is observed following urbanization and formal education.

The above-mentioned studies indicate a relationship between acculturation and cognitive test performance. The received view seems to hold that in the beginning of the acculturation process there may be substantial score differences on cognitive tests between natives and migrants; the more the migrants adapt to the main culture's way of life (mainly through schooling), the more similar their cognitive test score will become to the mean of the dominant group. Yet the size of the difference in test scores will vary across tests. Helms-Lorenz and Van de Vijver (1995) have shown that different types of cognitive tasks show dissimilar performance differences between Dutch migrant and native children from 6 to 12 years of age. The cultural loading (a generic term for explicit or implicit references to a specific cultural context, usually that of the test composer, in the instrument or its administration of the tasks) was related to cross-cultural differences in test performance. A higher cultural loading of the test items was found to give rise to larger cross-cultural differences in performance on cognitive tasks. Extrapolating these findings, it could be expected that cognitive instruments with a smaller cultural loading are less susceptible to acculturation influences.

To test these notions, a nonverbal intelligence test and a choice reaction-time test, which are both taken to have a relatively low cultural loading, were administered to a sample of migrant children in the Netherlands. Results of these tests, which are assumed not to be strongly influenced by cultural factors, are examined vis-à-vis pupils' grade marks, which are assumed to be more influenced by cultural factors.

In sum, the research questions are:

1. Is Berry's taxonomy of acculturation strategies appropriate for Dutch migrant children?
2. Are there differences between first- and second-generation children in acculturation strategy, cognitive test performance, or the relationship between strategy and performance?
3. Is there a relationship between acculturation strategy and cognitive test performance (both for tests that are more and less susceptible to cultural factors) among these children?

METHOD

Subjects

A group of 118 migrant children were involved in the study. The sample consisted of 61 female (25 first and 36 second generation) and 57 male (19 first and 38 second generation) subjects. Their ages ranged from 7 to 12 years (M = 10.22, SD = 1.38). Their ancestors come from Morocco (46%), Turkey (15.5%), Surinam (12%), Dutch Antilles, Bosnia, Serbia, Somalia, and Pakistan. The majority (64.9%) had lived in the Netherlands since birth. Some subjects (11%) had resided in the Netherlands less than 2 years, 21.9% between 2 to 10 years, and 1.8% longer than 10 years. The pupils were recruited from 7 schools in cities of at least 80,000 inhabitants in the Netherlands.

The reason for coming to the Netherlands differs across these groups. Groups of Moroccans and Turks were hired in the late 1960s and 1970s as cheap labour forces needed for the then rapidly expanding Dutch industry. The migration stream became smaller in the 1980s. During the last decade, migration from these countries has been restricted to reunite families (i.e. when one or two parents live in the Netherlands whilst their children are brought up by relatives abroad). Obtaining access to Dutch society is often difficult for these groups. Surinam and the Dutch Antilles are former Dutch colonies. The latter group, consisting of subjects from Bosnia, Serbia, Somalia, and Pakistan, are refugees who recently migrated to the Netherlands. Common to all these groups are relatively high unemployment rates (lowest among the Surinamese and Dutch-Antillian groups); furthermore, most groups have a relatively low level of education, both in the first and second generation.

Instruments

The Snijders-Oomen Nonverbal Intelligence Test (SON-R; Laros & Tellegen, 1991), was administered. The test was developed and validated in the Netherlands, and is composed of four test types: abstract reasoning tests, concrete reasoning tests, spatial tests, and perceptual tests. Because of time constraints, a shortened version was applied, consisting of four subtests excluding the perceptual

tests. The reliability of the short version of the SON-R is .90. The Categories and Analogies subtests are both abstract reasoning tests. Categories is a multiple-choice test in which the subject is shown three drawings of objects with a common characteristic. The subject has to select two drawings with the same characteristic from a set of five alternatives. The format of Analogies, which uses geometric stimuli, is

$$a : b = c : \{d_1, d_2, d_3, d_4\}.$$

The change from figure a to b should be applied to c. If correctly applied, this will give one of the four alternatives (d). The 60 items are arranged in order of increasing difficulty. Situations is a multiple-choice test that assesses concrete reasoning. The items consist of situation drawings with one or more missing parts. The correct solution has to be chosen from 4, 6, 9, or 10 alternatives. The Mosaics subtest is similar to Koh's blocks, used in the Wechsler scales. It is a performance test in which diverse target (mosaic) patterns have to be formed, using white/red squares. Each pattern consists of nine fields.

A choice reaction-time test was also administered. The test runs on an IBM-compatible computer. The instruction is simple and virtually nonverbal. After a visual warning, the sides of five black squares appear on the screen. After a period that randomly varies between 2 and 4 seconds, four of the five squares become white and one remains black. The subject should move the mouse, which is located at the centre of the screen at the beginning, to a target (black) square. The reaction time is the time elapsed between the onset of the stimulus and the beginning of the mouse movement.

Berry's (1980) conceptual scheme of four acculturation strategies was utilized to construct an acculturation questionnaire for children. His questionnaire, which is meant for adults, could not be used due to the complexity of the wording and the item content for our target population. A new questionnaire was developed; 4 acculturation strategies were crossed with 10 life domains, which were assumed to be relevant for children, yielding a total of 40 items. Each statement refers to a comparison of, on the one hand, the Netherlands, and on the other hand "my other country". This formulation was used in the questionnaire in order to avoid the listing of the specific country of the child or its parents. At the beginning of the testing session, the meaning of "my other country" was explained to the children. The 10 life domains were: books, learning more about a country, ethnicity of friends, importance of speaking a language, affinity to a language, place to live, ethnicity of teacher, place to work later in life, food, and games. Berry's two dimensions refer to the value of maintaining relationships with the original culture and the value of establishing relationships with the main culture. The questions in the original scales are too complex for these children and refer to issues that are hardly relevant to them. In order to avoid presenting issues to these children that are too complex or have no salience, it was decided to ask for the preferences of children in situations in which they can choose between the native and main culture.

The format of integration items was "I like [some aspect of the Dutch culture] and I like [the same aspect of the original culture]", of assimilation items "I like [some aspect of the Dutch culture] but I do not like [the same aspect of the original culture]", of separation items "I like [some aspect of the original culture] but I do not like [the same aspect of the Dutch culture]", and of marginalization items "I do not like [some aspect of the original culture] and I do not like [the same aspect of the Dutch culture]". As an example, the integration item related to books was "I like to read books in Dutch and I like to read books in my other language"; the assimilation item was "I like to read books in Dutch but I do not like to read books in my other language"; the separation item was "I like to read books in my other language but I do not like to read books in Dutch"; and the marginalization was "I do not like to read books in my other language and I do not like to read books in Dutch". The order in which the two cultures were listed in an item was randomized across the items of a domain. For each of the 40 items, the children were asked to indicate whether they agree or disagree with the statement. In order to maximize simplicity and avoid unwanted cognitive and linguistic aspects in the questionnaire, a dichotomous answer was asked instead of the Likert scales (more commonly employed in acculturation research). Cronbach's alphas of the four scales were appropriate: .76 for integration, .77 for assimilation, .70 for separation, and .85 for marginalization.

Background variables were collected concerning computer and mouse experience, language preference, country of origin of the subjects and their parents, length of residence in the Netherlands, and ethnicity.

Statistical Analyses

The dimensionality of the acculturation question-naire is addressed first. Because the issue has received scant attention, two different statistical analyses are applied here. The dimensionality was addressed both by a structure- and a level-oriented technique (Van de Vijver & Leung, 1997a, 1997b). The structure was first scrutinized in a series of exploratory factor analyses (principal components, using correlations). Four-, two-, and one-factorial solutions were compared. Furthermore, it has become common practice to use scale scores (i.e. sum of scores in each of the four scales) as variables for analysis, thereby not considering the question of the dimensionality of an item-level factor analysis. Our data analysis considered both item- and scale-level scores.

It could be argued that exploratory factor analysis does not sufficiently exploit the theoretical structure of the questionnaires and that it would be more appropriate to use statistical techniques that can compare a theoretically defined structure to an empirically obtained one. Therefore, a second analysis technique (level-oriented) was applied that can cater for a theoretical structure to be imposed on data: the linear logistic test model (LLTM; Fischer, 1974, 1995; Van de Vijver, 1988). An LLTM analysis can be considered as a nonlinear regression analysis, in which the relative success of item features is determined (a dichotomous indicator on the four strategies, indicating whether or not an item is assumed to measure that strategy) to predict scores on the item. A good fit of the data to the model implies that the children's choice behaviour is consistently governed by the theoretically assumed acculturation strategies whereas a poor fit would point to inconsistent choice behaviour by the children. The fit is evaluated here by means of the correlation between the (unconstrained) Rasch item parameters and the item parameters that are estimated on the basis of the sum of an acculturation style and a life domain parameter. The rationale and interpretation of the fit measure are compatible to a multiple correlation of a regression analysis in which item endorsement rates (comparable to the Rasch item parameters) are predicted on the basis of acculturation strategies and life domains. Van de Vijver (1991) reported several instances of numerically almost identical values for the correlation in the LLTM and this multiple correlation.

Another analysis involved the relationship of the background variables (i.e. acculturation strategy, second language usage, gender, and age) with the cognitive measures (i.e. school performance, IQ, and performance on the choice reaction-time measure). Because there were multiple input and output variables, structural equation modelling was used to link them. A MIMIC model (Multiple Input, MultIple Causes) was applied. Such a model links input and output variables through a single latent variable, which was called cognitive acculturation. The cognitive measures are then taken to be the indicators of cognitive acculturation, which are influenced by background variables through this latent variable. Separate analyses for the first and second generation were carried out. Various models were tested with increasing equality constraints on the estimated parameter values across generations. Such a multisample MIMIC allowed for a fine-grained analysis of intergenerational similarities and differences. Other MIMIC applications in cross-cultural research can be found in Van Haaften and Van de Vijver (1996) and Van Haaften, Van de Vijver, Leenaars, and Driessen (1998).

RESULTS

In the first set of data analyses the dimensionality of the acculturation strategies was examined. An exploratory factor analysis of the item scores of the acculturation questionnaire was carried out. On the basis of a scree-test, four factors were extracted, explaining 43.1% of the variance (eigenvalues: 7.26, 4.13, 2.70, 2.45). Loadings have been presented in Table 1 (Varimax rotation was used in all analyses). Thirty-three out of 40 items (82%) of the items loaded on the appropriate factor. Marginalization was the most clearly defined factor; all marginalization items showed their highest loading on a single factor. Nine assimilation items showed their highest loading on the same factor while one item went to the integration factor. Eight separation items showed the highest loading on a single factor; one item loaded on integration and one on marginalization. The largest number of unintended loadings was found for the integration factor. Only 6 out of 10 items loaded on 1 factor while 3 items loaded on assimilation and 1 on separation. In addition, various items also showed secondary loadings. In some cases these even showed a clear patterning; for example, there were secondary loadings of several assimilation items on the integration factor and of integration items on the assimilation factor. Although not further reported here, the

utilization of oblique rotations and multidimensional scaling procedures did not lead to a more explicit delineation of the four factors. It can be concluded that despite the strict control of item content, item-level factor analysis did not provide unequivocal support for a four-factorial model of acculturation strategies among our group of Dutch migrant children. More deviations could probably be expected if the items were formulated more loosely.

An incomplete confirmation was also found for a two-factor solution. As can be seen in Table 1, the second factor showed positive, high loadings for assimilation and negative loadings for integration, thereby confirming the expected bipolarity of attitudes toward the native culture. The first factor was unipolar. The marginalization and separation items both loaded positively on the first factor, although the loadings of marginalization tended to be much higher.

The last column of Table 1 presents the unifactorial solution. A bipolar factor was found, with integration items showing negative loadings and all other items showing positive loadings. The factor was interpreted as reflecting positive cultural choice. Individuals who favour integration choose for both cultures, whereas all other acculturation strategies imply some negative choice, either against the main culture, the native culture, or both.

The results of the analyses of the scale scores are presented in Table 2. The distribution of the four eigenvalues of an exploratory factor analysis strongly suggested the extraction of a single factor (eigenvalues: 2.01, 0.87, 0.59, and 0.52). The factor was bipolar, with integration on the negative end and the three other acculturation strategies close to each other at the other end. The underlying dimension can, again, be interpreted as reflecting a positive choice for both cultures. An examination of the two-factorial solution revealed that the first factor reflected attitudes toward the native culture, with a loading of .89 for assimilation and of −.77 for integration. The second factor was unipolar; both marginalization and separation showed high positive loadings (.77 and .86, respectively). In sum, both item- and scale-level analyses strongly suggest the presence of a single bipolar factor, with acculturation at one end and the three other strategies at the other.

The dimensionality of the acculturation strategies was also addressed using a level-oriented technique (LLTM). In order to gain insight into the popularity of the various acculturation strategies across life domains, average scores per strategy and domain are presented in Table 3. Integration was by far the most frequently chosen acculturation strategy among the children. The second, though far less popular, strategy was assimilation, followed by separation and then marginalization, which was chosen very infrequently. Furthermore, the variations across life domains were small.

Three different models were fitted to the data. The first one postulated four independent acculturation strategies. The fit measure (correlation) showed a high value of .96, pointing to a good fit. The parameter value (i.e. endorsement) for integration was much higher than for the other strategies, rather similar values were found for assimilation and separation, and marginalization was the least popular (Table 4). The second model postulated two bipolar independent dimensions, with integration and assimilation constituting the first dimension and separation and marginalization the second. A poor fit measure of .68 was obtained. The poor results resemble those of the two-factor solution of the exploratory factor analysis, in which the second factor was found to be unipolar. Finally, a model was tested in which a single bipolar acculturation strategy was postulated; integration constituted the negative pole of the dimension and the other three strategies constituted the positive pole. The choice of this model was motivated by our findings of the popularity of the integration option. The fit measure was .93. This value is surprisingly high if one realizes that a single item facet (i.e. one dichotomous predictor) is used to predict the observed item endorsement rates of 40 items. The LLTM analyses confirm the finding that the acculturation strategies can be seen here as a single bipolar dimension, with integration at one end and the other strategies at the other end of the continuum.

The role of life domains was investigated in separate analyses. More specifically, LLTM models were fitted in which, in addition to acculturation strategies, parameters were introduced for life domains. For instance, in addition to 4 acculturation strategies, 10 life domain parameters were fitted. In none of the LLTM analyses did any of the basic parameters for life domains obtain a value significantly different from zero. It could be concluded that the children's choice behaviour is determined by the acculturation strategy and not at all influenced by the life domain.

TABLE 1
Factor Loadings of the Items of the Acculturation Questionnaire: Four-, Two-, and One-factor Solutions[a]

	Number of Factors						
	Four				Two		One
Item[b]	Marg	Ass	Int	Sep	Marg + Sep	Int vs. Ass	Culture Choice
Marginalization							
Book	*.45*	.04	−.15	−.16	.39	.09	.38
Children	*.89*	.10	−.14	.08	.48	.09	.46
Food	*.56*	.02	−.17	−.21	.88	.14	.82
Games	*.84*	.11	−.02	.10	.65	−.07	.51
Language	*.70*	.15	.25	.19	.51	.12	.49
Lang. aff.	*.72*	−.05	−.20	−.14	.84	.08	.75
Learning	*.45*	−.15	−.42	.18	.71	−.04	.59
Living	*.82*	.22	−.11	.14	.66	.04	.58
Teacher	*.63*	.06	.19	.20	.72	−.03	.59
Work	*.71*	.15	.22	.16	.83	.22	.82
Assimilation							
Book	−.22	*.66*	−.04	−.07	−.24	.56	.09
Children	.33	*.37*	−.17	.05	−.10	.36	.10
Food	−.13	.07	−.51	.00	.34	.39	.49
Games	.17	*.54*	−.03	.07	−.12	.54	.18
Language	.05	*.58*	−.13	.05	.02	.38	.22
Lang. aff.	.19	*.53*	.12	.13	.18	.46	.39
Learning	−.02	*.45*	−.01	.18	.06	.55	.34
Living	.10	*.66*	−.23	−.03	.20	.36	.36
Teacher	−.02	*.66*	−.04	−.31	−.02	.50	.25
Work	−.01	*.63*	.02	.01	.09	.66	.42
Integration							
Book	−.15	*−.32*	.12	−.04	−.15	−.32	−.30
Children	−.12	−.09	*.77*	.05	−.21	−.40	−.39
Food	−.05	−.15	.43	−.52	−.13	−.52	−.38
Games	−.04	−.10	*.59*	−.13	−.22	−.44	−.42
Language	−.11	−.05	*.58*	.02	−.40	−.49	−.59
Lang. aff.	−.06	−.17	*.60*	−.08	−.10	−.44	−.31
Learning	−.35	−.30	*.42*	−.16	−.12	−.38	−.30
Living	.16	−.40	*.50*	.00	−.10	−.49	−.35
Teacher	−.25	*−.37*	.27	.09	−.06	−.61	−.37
Work	−.04	*−.54*	.30	−.01	.13	−.62	−.22
Separation							
Book	−.11	−.06	−.09	*.38*	.01	.03	.02
Children	.28	.17	−.04	*.47*	−.04	.32	.14
Food	−.19	.33	−.03	*.51*	.41	.19	.44
Games	*.34*	−.08	−.22	.22	.19	.04	.18
Language	−.01	.06	.17	*.71*	.44	.03	.39
Lang. aff.	.31	.04	−.42	*.32*	.40	.06	.37
Learning	.34	.09	.10	*.43*	.19	−.00	.16
Living	.20	.02	−.02	*.60*	.41	.29	.50
Teacher	.07	−.11	−.17	*.41*	.41	−.05	.32
Work	*.34*	−.13	−.08	.29	.36	.06	.34

[a] For the four- and two-factor solutions the highest loading, in absolute value, is italicized.
[b] See the Method section for an explanation of the terms.
Marg = Marginalization; Ass = Assimilation; Int = Integration; Sep = Separation; Lang. aff. = Affinity to language.

There is a strong convergence of the results of the exploratory factor and LLTM analyses. The children's attitudes are remarkably consistent across life domains. The existence of two independent acculturation dimensions was not supported in our data, whereas strong support was found for a unidimensional strategy. The latter reflects cultural choice; integration is located at

TABLE 2
Factor Loadings of the Scales of the Acculturation
Questionnaire: Two- and One-factorial Solutions

	Number of Factors		
	Two		*One*
Scale	*Int vs. Ass*	*Marg + Sep*	*Culture Choice*
Assimilation	.89	.07	.69
Integration	−.77	−.30	−.76
Marginalization	.25	.77	.72
Separation	.09	.86	.67

Int = Integration, Ass = Assimilation, Marg = Marginaliza-
tion, Sep = Separation.

one end and the other acculturation strategies at
the other.

The second set of analyses addressed genera-
tion differences in acculturation strategies. A
multivariate analysis of variance was carried
out, with generation (two levels) as independent
variable and the four strategies as dependent vari-
ables. The multivariate effect of generation was
not significant. Yet the increase of assimilation
from the first to the second generation was sig-
nificant, $F(1,114) = 3.91$, $P < .05$ (upper part of
Table 5). The decrease of integration was border-
line significant ($P = .08$). With this small sample,
conclusions can only be tentative, but there seems
to be an overall pattern: integration remained by
far the most preferred strategy, but the second
generation also tended to consider other strate-
gies, in particular assimilation.

A subsequent set of analyses considered the
third research question, dealing with the relation-
ship between acculturation strategy and cognitive
test performance, using a MIMIC model. The
latent variable, called cognitive acculturation, is
measured by the cognitive tests (the dependent
variables) and influenced by various independent
variables. The predictors were cultural choice (i.e.
factor scores on the one-factorial solution of the
acculturation questionnaire), frequency of use of
second language (i.e. a combined score of second
language usage in talking with parents, siblings,
and peers), gender, and age. The dependent vari-
ables were a measure of scholastic performance
for mathematics and reading (standardized per
school class), intelligence quotient, and the choice
reaction-time measure (standardized per age
group). Separate models were fitted to the data
of the first generation ($N = 40$) and the second
generation ($N = 76$). The covariance matrices of
the two groups were found to differ [$\chi^2(28,116) =
47.50$, $P < .05$]. A MIMIC model with identical
parameters across the two groups showed a poor
fit [$\chi^2(36,116) = 57.57$, $P < .05$]. In the next step,
various nested models were examined, gradually
imposing fewer equality constraints across cul-
tural groups (see Table 6). A model postulating
the equality of error variances of the latent vari-
able (υ) and dependent variables (Θ_ε), as well as
correlations of the predictors (Φ), was found to
show a reasonable fit [$\chi^2(30,116) = 43.02$, n.s].
The choice of this model was also supported by
the large reduction in its largest absolute standar-
dized residual, compared to the model in which
the factor loadings were also held constant (from

TABLE 3
Proportion of Choices of Each Acculturation Strategy per Domain

	Acculturation Strategy				
Domain	*Assimilation*	*Integration*	*Marginalization*	*Separation*	*Mean*
Book	.20	.88	.10	.08	.32
Children	.04	.78	.04	.33	.30
Food	.07	.89	.05	.12	.28
Games	.17	.86	.04	.10	.29
Language	.14	.84	.08	.12	.30
Lang. aff.	.13	.86	.04	.08	.28
Learning	.22	.79	.03	.11	.29
Living	.16	.92	.08	.12	.32
Teacher	.36	.73	.05	.16	.33
Work	.22	.79	.06	.15	.31
Mean	.17	.83	.06	.14	.30

Lang. aff. = Affinity to language.

TABLE 4
Estimated Endorsement Parameters of the Linear
Logistic Test Model of the Acculturation Questionnaire

Acculturation Strategy	Endorsement
Four independent strategies	
Assimilation	0.00^a
Integration	3.28*
Marginalization	−1.26*
Separation	−0.29*
Two bipolar strategies	
Integration (−) vs. assimilation (+)	−2.10*
Marginalization (−) vs. separation (+)	0.28*
One bipolar strategy	
Integration (−) vs. all others (+)	−3.69*

[a] Fixed at zero.
* $P < .05$.

6.49 to 2.55) and the almost significant incremental chi-square statistic of the model. As can be seen in Fig. 1, the cognitive measures showed a significant loading on the cognitive acculturation factor. Interestingly, in the first generation two predictors showed a significant, positive relationship: both the cultural-choice factor and age had positive regression weights. Both older children and those who favour an integration strategy showed a higher degree of cognitive acculturation. None of the predictors proved significant in the second generation. Two predictors were strongly correlated (Φ matrix): age and cultural choice. This confirms our earlier finding, of older children tending to opt less frequently for integration.

In a final analysis the scores of the first and second generation on the variables of the MIMIC model were examined. A multivariate analysis of variance was carried out, with all MIMIC variables as dependent variables and generation (two levels: first and second) as independent variable. The multivariate test yielded a highly significant value (Wilks' lambda = .73, $P < .001$). The results of the univariate tests are shown in the lower part of Table 5. A significant difference was found for the acculturation score: second-generation children were less likely to opt for integration than first-generation children [$F(1,111) = 5.92$, $P < .05$]. Second-language usage was found to increase sharply from the first to the second generation [$F(1,111) = 22.87$, $P < .001$]. School performance and intelligence test scores did not differ across generations. The first generation was found to show higher scores (i.e. shorter reaction times) on the choice reaction-time task [$F(1,111) = 13.29$, $P < .001$].

DISCUSSION

Acculturation and its cognitive correlates were studied among 118 Dutch migrant children. It was found that the children's choice behaviour is remarkably consistent across life domains and can be taken to be governed by an underlying acculturation strategy. Exploratory factor analyses of scale scores did not confirm the existence of two bipolar acculturation dimensions in our sample.

TABLE 5
Means of First- and Second-generation Children on Four
Acculturation Strategies and the MIMIC Variables, and Tests of
Intergenerational Differences

| Strategy	Generation		F (1,114)
	First	Second	
Acculturation strategies			
Integration	8.77	8.07	3.16
Assimilation	1.26	2.07	3.91*
Separation	1.23	1.53	0.78
Marginalization	0.35	0.79	1.82
MIMIC variables			
Culture choice	−0.30	0.17	5.92*
Frequency of second language usage	0.55	−0.31	22.87*
Age	9.13	9.34	0.56
School performance	−0.03	0.03	0.08
Intelligence quotient	92.80	96.97	2.04
Reaction speed	0.28	−0.28	13.29*

* $P < .05$.
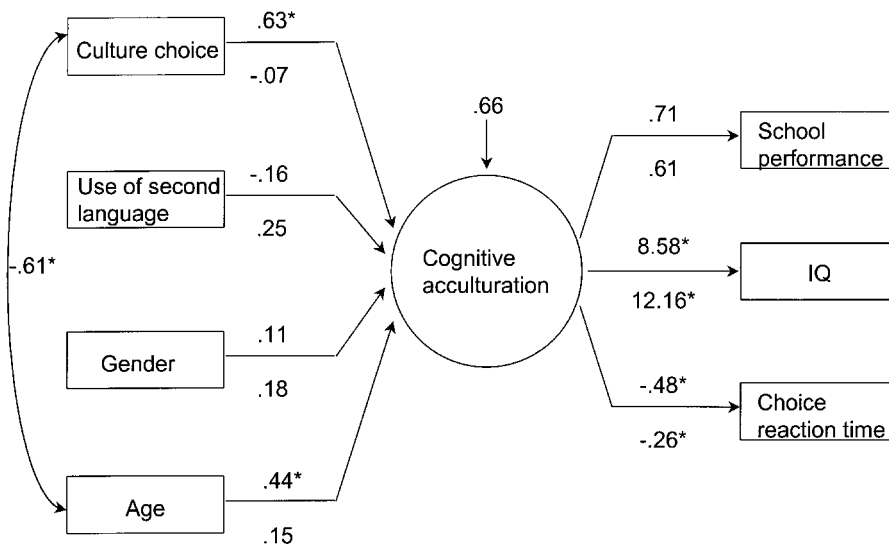
FIG. 1.   Parameters of the (within-group standardized) MIMIC model of acculturation for the first and second generation (above and below the arrows, respectively). Note: The loadings of school performance were fixed at 1 in the nonstandardized solution.

TABLE 6
Fit Indices of the LISREL Solution to Test the Equality of the Parameters for First- and Second-generation Children

Model	χ^2	df	P	$\Delta\chi^2$	P
Equal Λ_y, $\upsilon <\Theta_\varepsilon <\Phi$, and Γ	57.57*	36	.01*		
Equal Λ_y, $\upsilon <\Theta_\varepsilon$, and Φ	48.13*	32	.03*	9.44	.05
Equal $\Phi <\upsilon$, and Θ_ε	43.02	30	.06	5.11	.08
Equal Θ_ε and υ	30.65	20	.06	12.37	.26
Equal Θ_ε	29.48	19	.06	1.17	.28
MIMIC model without equality constraints	24.89	16	.07	4.59	.20

*P < .05.

Rather, the four acculturation strategies constitute a single underlying dimension, with integration at one end and assimilation, separation, and marginalization at the other. An analysis in which the choices of the children were modelled according to a Linear Logistic Test Model showed convergent results. The underlying dimension was interpreted as indicating cultural choice: integration does not imply a choice against the native or main culture, whereas all other options imply a choice against at least one of these. As argued in the Introduction, these results are compatible with Berry's conceptual scheme. The two constituting dimensions of the scheme (i.e. attitudes toward the native and main society) merge here into one factor and point to a narrow range of choice.

Integration was by far the most popular strategy among the Dutch immigrant children.

Yet it is interesting to observe that the correlation of integration and age is negative. This amounts to a picture of children who adopt elements of different cultures when they are young (e.g. they learn the languages of the native and main culture, they often have friends from both cultures, etc.) and who will increasingly choose in favour of one of the cultures and prefer either assimilation or separation (marginalization was very infrequently chosen) when they become older.

One of the foci of the present study involved the relationship of acculturation strategy and cognitive test performance. It was found that cognitive acculturation, measured by the Snijders-Oomen Nonverbal Intelligence Test and a computerized choice reaction-time measure, was related to acculturation strategy and age in the first but not in the second generation. Assuming

that these findings are replicable in migrant groups outside the Netherlands, a threshold model can be envisaged to explain this change from the first to the second generation. In the first generation the process of learning the foreign language and culture may be more determined by individual differences in intellectual ability and motivation to adjust, whereas in the second generation these factors have lost much salience. For the culture-reduced tests (Jensen, 1980), such as those applied in the current study, a child will quickly have reached a threshold level beyond which there will be no noticeable improvement without further training. In formal education the child is repeatedly exposed to tests and test-like stimuli. It is quite likely that these testing skills are sufficiently overlearned so as to reduce or even eliminate the influence of individual differences in mastery. For culture-reduced tests a threshold will be reached sooner than for instruments with a higher cultural loading. It could be speculated that for such instruments a stronger relationship with the acculturation strategy will be observed, both in the first and the second generation.

A comparison of the first and second generation revealed some differences. Second-generation children choose integration less frequently than first-generation children do. This may be related to the living conditions of the children. The communities in which they live are not very large and for essential institutions, such as schooling and health care, migrant groups rely on the main society. The low scores of separation and marginalization and the increase of assimilation scores from the first to the second generation may be related to this. Moreover, as is often reported, second-language usage was more common among second-generation children. The latter group often speaks Dutch or combines Dutch and their native language when they talk to siblings. For example, in the Turkish group, code switching is very common (Backus, 1992).

Results of some cognitive measures were unexpected. Contrary to expectation, we did not find a significant cross-generation difference in scholastic performance. Although accidental cohort differences may have played a role, the results are more likely to be due to the limited comparability of school marks across pupils in multicultural classes. In previous research (e.g. Van de Vijver & Willemse, 1991) we found that school marks of native and migrant children often show a limited comparability. Whereas marks obtained by native children reflect scholastic performance and can often be compared across pupils from the same class, marks of migrant children are often used to monitor intra-individual progress. This practice limits the comparability of such scores across individuals and groups. The significant generation difference in choice reaction time was unexpected. The data set presented here is part of a large project (of the second author) in which choice reaction-time data of over 1400 native and migrant children have been collected. In this data set no significant differences were found between first- and second-generation children.

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