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Published in:
Evolution and Human Behavior

DOI:
[10.1016/j.evolhumbehav.2015.09.007](https://doi.org/10.1016/j.evolhumbehav.2015.09.007)

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Document Version
Publisher's PDF, also known as Version of record

Publication date:
2016

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

van Brummen-Girigori, O., & Buunk, A. P. (2016). Intrasexual competitiveness and non-verbal seduction strategies to attract males: A study among teenage girls from Curaçao. *Evolution and Human Behavior*, 37(2), 134-141. <https://doi.org/10.1016/j.evolhumbehav.2015.09.007>

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Original Article

Intrasexual competitiveness and non-verbal seduction strategies to attract males: a study among teenage girls from Curaçao

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ARTICLE INFO

Article history:

Initial receipt 27 December 2014

Final revision received 25 September 2015

Keywords:

Non-verbal seduction strategy

Life history

Father absence

Curaçao

ABSTRACT

We hypothesized that teenage girls from the Caribbean island of Curaçao who grew up without a father would be more intrasexually competitive than teenage girls who grew up with a father, and would therefore more often use non-verbal seduction strategies to attract males. A pilot study showed a high inter-observer reliability for the observation of non-verbal seduction strategies. In study 1, among 105 teenage girls with a mean age of 16.29 years, reliable scales were developed reflecting various non-verbal seduction strategies. Study 2 was conducted among 123 teenage girls with a mean age of 18.73 years. Compared to girls who grew up with their father, girls who grew up without their father before the age of fourteen reported overall more intrasexual competitiveness and more non-verbal seduction strategies, including direct flirtation, peacock behavior, the use of hairstyles with waves, the use of facial make-up, the use of conspicuous nail-care, and active and restless behavior in the presence of males. Intrasexual competitiveness was associated with most strategies, and was a significant mediator between father absence and the expression of most non-verbal seduction strategies. From a life-history perspective, we discuss possible explanations for, and implications of, these findings.

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1. Introduction

Even casual observers will note that women may differ considerably in their preferences regarding clothing style, the use of accessories, and the use of facial make-up. While these preferences obviously vary among women from different cultures, preferences may not only depend on cultural norms regarding looking attractive and being sexy, but even more on women's courtship motivations. For example, one study showed that women are clearly aware of the social function of their clothing and that they in some cases alter their clothing style to match their courtship motivation. More specifically, women who rated their clothing as “sexy” and “bold” in a discotheque also reported that their intention for the evening was to flirt or to find a sex partner (Grammer, Renninger, & Fischer, 2005). In a similar vein, various studies have shown that women may use self-promotion, in the sense of wearing figure-hugging clothes and using facial make-up, in order to attract the attention of males (Barber, 1995; Buss, 1988; Buss & Schmitt, 1993; Fisher & Cox, 2009; Schmitt & Buss, 1996; Symons, 1979; Walters & Crawford, 1994).

The current study examined differences between teenage girls who grew up with their father (father-present girls) and teenage girls who grew up mainly without a father, including girls whose father had only a casual relationship with their mother (father-absent girls). We

focused on differences between the two groups in intrasexual competitiveness and in the variety of non-verbal seduction strategies used, including the use of facial make-up and accessories, the wearing of sexy clothes, and direct flirtation to attract males. As far as we know, there has been no systematic observational research on these issues. The present study was conducted on the Caribbean island of Curaçao, which is ethnically comprised of an Afro-Caribbean majority. The Central Bureau of Statistics Curacao (2011) estimates the population of Curaçao to be around 150,000. Curaçao provides a unique setting to examine this issue, because a substantial percentage (40%) of the population is raised in homes where the father is absent, and the population is biased toward women with a sex ratio of 84 men to 100 women. Many men father multiple children with multiple partners, and often provide little paternal care.

Following life history theory, we hypothesized that father-absent girls would be inclined to follow a different life history strategy than father-present girls. According to life history theory, because of limited resources, individuals have to make trade-offs between mating efforts and parenting efforts in order to reproduce (e.g., Chisholm, 1993; Figueredo et al., 2006). These trade-offs can be arranged on a continuum that is now commonly referred to as the fast–slow continuum of life history strategy. A life history strategy reflects two basic decisions: whether to reproduce now or later and the amount of resources to invest in each offspring (Stearns, 1992). In general, humans tend to follow a “slow” life history strategy (Bjorklund & Shackelford, 1999; Chisholm, 1993), but like other species, the strategy pursued depends on the

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environmental conditions. That is why individuals show variations regarding mating behavior, the age at first childbirth, and total fertility, as an adaptive response to local environmental conditions, such as the level of paternal investment and life expectancy (Low, Hazel, Parker, & Welch, 2008; Nettle, 2009; Quinlan, 2007).

Individuals at the faster end of the continuum tend to maximize their short-term reproductive success (e.g., Figueredo et al., 2006; Kaplan & Gangestad, 2005). In general, a faster life history strategy is considered to be the optimal reproductive strategy when environmental conditions are adverse or unstable (e.g., Chisholm, 1993) and when populations are still growing (e.g., Rushton, 2004). There is also considerable evidence that father absence may trigger a fast life strategy. According to Belsky, Steinberg, and Draper (1991), there is a sensitive period from birth to between five and seven years, during which family experiences shape children's expectations of their reproductive options as an adult. More specifically, the timing of father absence may shape the life history, which may have consequences for the stability of pair bonding among the offspring. For example, in an observational study, Hetherington (1972) found that “early father absent girls” (abandoned before the age of five) tended to seek more attention from adult males than “late father absent girls” (abandoned after the age of five). There is also evidence that girls raised in father-absent homes reach menarche earlier than girls raised in father-present homes (e.g., Webster, Graber, Gesselman, Crosier, & Schember, 2014). Moreover, a recent study conducted in the Caribbean island of Curaçao showed that early father-absent girls compared to late father-absent and father-present girls initiated sexual intercourse at a significantly younger age and were less interested in getting married and having grandchildren (Van Brummen-Girigori & Buunk, 2015). Finally, previous studies have shown that harsh and unpredictable environments including lack of resources may also trigger development toward a fast life strategy (e.g., Ellis, Figueredo, Brumbach, & Schlomer, 2009), which may accelerate the implementation of reproductive strategies.

Conversely, individuals at the slower end of the continuum maximize long-term reproductive success (e.g., Figueredo et al., 2006; Kaplan & Gangestad, 2005) and will produce fewer offspring, provide greater nurturing, show high parental effort, and exert low mating effort. A slow life history strategy is more common when population size stabilizes and mortality rates are low. Under such conditions, girls learn that they can count on investment by the father of their children, and are therefore better able and motivated to engage in stable long-term relationships, and will consequently be relatively more successful in raising their children (e.g., Figueredo et al., 2005). Overall, individuals who grew up in harmonious homes with their father present will mature later, postpone sexual activity, and display greater investment in the fewer children they produce (e.g., Belsky et al., 1991; Bjorklund & Shackelford, 1999; Ellis, 2004; Pesonen et al., 2008; Tither & Ellis, 2008).

In the present research, we hypothesized on the basis of life history theory that father-absent teenage girls would be more likely follow a fast life history than father-present teenage girls. Therefore, such girls would be more interested in attracting a partner at a young age, especially for short-term mating. As a consequence, father-absent girls will be intrasexually more competitive and engage more often in non-verbal seduction to defeat other girls in attracting males. Indeed, intrasexual competitiveness among females concerns generally attracting males (e.g., Buss, 1989; Campbell, 2004; Dijkstra & Buunk, 2002; Rucas et al., 2006). This competitiveness is captured by the scale developed by Buunk and Fisher (2009). This scale assesses the extent to which individuals view contact with same-sex others, especially in the context of contact with the opposite sex, in competitive terms (Buunk & Fisher, 2009). Following Buunk and his colleagues (e.g., Buunk & Fisher, 2009), among women, such competitiveness would include the desire to defeat other women rather than to perform well (e.g., Van Yperen, 2003); the desire to view themselves as better than other girls (e.g., Zuckerman & O'Loughlin, 2006); and feelings of envy and frustration when other girls are in general better off or receive

more attention from boys (e.g., Smith & Kim, 2007). Several studies have shown that females are especially intolerant of attractive peers and more often use indirect aggression against them than against less attractive peers (Leenaars, Dane, & Marini, 2008), especially when intrasexual competition is made salient, for example when the rival is conversing with a male (Baenninger, Baenninger, & Houle, 1993).

We reasoned that the use of non-verbal seduction strategies is a way to compete with other teenage girls in attracting mates, and that father absence therefore affects the use of non-verbal seduction strategies through intrasexual competitiveness. To summarize, the present research investigated the following issues.

1. Do father absent teenage girls report more intrasexual competitiveness than father-present teenage girls?
2. Do father absent teenage girls use more non-verbal seduction strategies to attract males than father-present teenage girls?
3. Is intrasexual competitiveness associated with these non-verbal seduction strategies?
4. Does intrasexual competitiveness mediate between father absence versus father presence and the use of non-verbal seduction strategies?

In a preliminary study, we made an inventory of non-verbal seductive behaviors, and quantified inter-observer reliability when assessing these behaviors. In study 1, we examined whether the non-verbal seduction behaviors could be reduced to a number of broader non-verbal seduction strategies that teenage girls use to attract males. In study 2, we investigated the four research questions outlined above.

2. Pilot study

Informal observations by research assistants and interviewers during a prior study had already suggested that father-absent teenage girls seem more often to use non-verbal seduction strategies in order to attract males than father-present teenage girls. The seduction strategies included flirtatious behavior, swaying their hips, allowing themselves to be touched by males, wearing colorful jewelry, and using a large amount of make-up. On the basis of these observations, a list of 40 non-verbal seductive behaviors was compiled (Table 1). Observers were instructed to indicate on a scale from 1 (“not applicable”) to 5 (“completely applicable”) how much each behavior applied to the observed teenage girls. The participants were observed at the Brion Plein, which is a popular place youths visit after a school day to relax and meet their peers. All observations took place between 11:30 and 15:30, because in this period there is a peak of young people present to interact with each other. As the data were collected live and in real time, the observers were trained extensively before they started the observations for this study. The observers went to the observation area three times to practice, and discussed their observation results to reach consistency. As a result of the training, when making independent observations, the observers reached inter- and intra-observer reliabilities between .95 and .99 at the item level. Therefore, in the following studies, the two observers jointly filled out the observation forms.

3. Study 1

The aim of our first study was to classify the non-verbal seduction behaviors into broader non-verbal seduction strategies that teenage girls may use to attract males.

3.1. Method

3.1.1. Participants

The sample included 105 teenage girls (age, $M = 16.29$, $SD = 1.73$). All participants were living on Curaçao and were following an educational program during the period of the study. The participants were approached at the same location and at the same time as in the pilot

Table 1
Factor analysis of non-verbal seduction strategies

Item	Factor								
	1	2	3	4	5	6	7	8	9
Reacts instantly to flirting behavior of males (when she is approached or whistled at)	.79								
Laughs constantly when she is communicating with males	.75								
Allows herself to be touched by males	.70								
Turns around when whistled at by males	.67								
Stands close to males	.56								
Shows clearly that she has a Blackberry or iPhone.	.55								
Sways her hips greatly when she walks	.39								
Wears bright lipstick		.72							
Wears bright, colorful jewelry		.69							
Fragrance powder on the breast is visible		.55							
Wears highly scented perfume		.53							
Is noisy, talks loudly			.84						
Waves her hands as she talks			.74						
Laughs out loud			.71						
Moves a great deal/does not stand still			.69						
Wears synthetic (e.g., polyester) clothes (not uniform)				.82					
Wears high heels				.72					
Frequently eats sweets (e.g., wine gums)				.75					
Allows males to eat the sweets (wine gums) out of her mouth				.51					
Sports a hairstyle with prominent hair waves that stands out because of the volume					.75				
Uses lip liner					.71				
Wears excessive lip gloss, making the lips shiny					.69				
Wears a great deal of make-up					.56				
Wears bracelets that make a lot of noise when she moves/talks						.71			
Wears a big pair of sunglasses						.67			
Wears numerous bracelets						.63			
Wears large, striking earrings						.62			
Wears lollipop-shaped accessories in pinned-up hair							.86		
The “lollipop” is removed from her hair by males							.79		
Walks around with a “lollipop”							.55		
Has fake nails								.84	
Has long, brightly colored nails								.78	
Watches to see if she is being observed			.37					.41	
Wears sexy clothing when not in school uniform (tight clothes, short skirt, shows stomach, or accentuates the breasts)									.80
Associates with late teenage girls who wear sexy clothing when not in school uniform									.79
Eigenvalues for each factor	3.53	2.89	2.88	2.78	2.70	2.51	2.41	2.33	1.64
Total explained variance (%)	10.10	8.26	8.25	7.96	7.59	7.17	6.89	6.67	4.70

study. The participants were asked to participate voluntarily in this study and were offered a bar of chocolate as a sign of gratitude for their cooperation. This study was approved by the Ethical Committee for Social Sciences at the University of Curaçao, Dr. Moises da Costa Gomez.

3.1.2. Materials and procedure

After being observed by the two observers, and rated on the 40 non-verbal seductive behaviors used in the pilot study (see Table 1), the participants were approached by the same two observers and asked whether they would collaborate with our study by answering a few questions such as their age, birthplace, and educational level, and whether they grew up with their father. All participants approached agreed to cooperate; no one declined to participate in our study.

3.2. Results and discussion

In order to reduce the 40 items to a small number of scales, a factor analysis with varimax rotation was conducted. We only included items with a loading equal or higher than .37. As can be seen in Table 1, the factor analysis provided nine factors with eigenvalues greater than one. The first dimension was labeled *direct flirtation* (henceforth referred to as *flirtation*), because it referred to behaviors such as “reacts instantly to flirting behavior of males,” “laughs constantly when she is communicating with males,” “allows herself to be touched by males,” “turns around when whistled at by males,” “stands close to males,” “shows clearly that she has a Blackberry or iPhone,” and “sways hips greatly when she walks.”

The second dimension was labeled *peacock behavior* (henceforth referred to as *peacock*), because it referred to behaviors such as “wears bright lipstick,” “wears bright, colorful jewelry,” “fragrance powder on the breast is visible,” and “wears highly scented perfume.”

The third dimension was labeled *restless and active behavior* (henceforth referred to as *restless*) and included behaviors such as “is noisy, talks loudly,” “waves her hands as she talks,” “laughs out loud,” “moves a great deal/does not stand still,” and “watches to see if she is being observed.” The latter item (“watches to see if she is being observed”) had a loading of .40 on the factor of *nail care*, but for substantive reasons we decided to add the item to this third factor.

The fourth dimension was labeled *sweet temptation*, because it referred to behaviors such as “wears synthetic (e.g., polyester) clothes,” “wears high heels,” “frequently eats sweets (e.g. wine gums),” and “allows males to eat the sweets (e.g. wine gums) out of her mouth.”

The fifth dimension was labeled *use of hairstyles with waves and make-up* (henceforth referred to as *hairstyle & make up*), because it referred to behaviors such as “sporting prominent hair waves that stand out because of the volume,” “uses lip liner,” “wears a large amount of facial make-up,” and “wears excessive lip gloss, making the lips shiny.”

The sixth dimension was labeled *use of jewels and accessories* (henceforth referred to as *jewels & accessories*), because it referred to behaviors such as “wears bracelets that make a lot of noise when she moves/talks,” “wears a big pair of sunglasses,” “wears numerous bracelets,” and “wears large, striking earrings.”

The seventh dimension was labeled *lollipop*, because it referred to behaviors such as “wearing lollipop in pinned-up hair,” “the lollipop is removed from her hair by males,” and “she walks around with a lollipop.”

The eighth dimension was labeled *conspicuous nail care* (henceforth referred to as *nail care*), because it referred to features such as “has fake nails” and “long, brightly colored nails.”

The ninth dimension was labeled *sexy outfit*, because it referred to behaviors such as “wears sexy clothing when not in school uniform (tight clothes, short skirt, shows stomach or accentuates the breasts)” and “associates with teenage girls who wear sexy clothing when not in uniform.”

On the basis of the factor analysis, nine observational scales were constructed, and the reliability of each scale was assessed. The analyses indicated that for each scale the reliability was higher than .70, with the exception of *sexy outfit* (see Table 2). Therefore, we excluded the scale *sexy outfit* from further analyses and from study 2.

3.2.1. Means and standard deviations of the different scales for non-verbal seduction strategies, and the correlations between the scales

In Table 2, for each non-verbal seduction strategy, the mean, standard deviation, and Cronbach's alpha are presented, as well as the Pearson correlations with the other strategies. As Table 2 shows, the correlations between the strategies were in general low to moderate. The majority of the correlations was lower than .30.

4. Discussion of study 1

Our observational study produced nine dimensions of non-verbal seduction strategies. The reliability of the majority of the scales based on the factor analysis was good, with the exception of the *sexy outfit*. Therefore, we excluded this scale from study 2. It may be noted that some observed behaviors may partially operate on an unconscious level, such as *restless and active behavior*. On the other hand, some behaviors such as *use of hairstyles with waves and facial make-up* will manifest themselves on a more conscious and intentional level. We do not know to what extent the various behaviors were intentional or not. Nevertheless, we were able to develop eight specific scales of non-verbal seduction strategies women may use for attracting males.

5. Study 2

The purpose of study 2 was to examine whether father absent teenage girls report stronger feelings of intrasexual competitiveness and, consequently, use non-verbal seduction strategies to attract males more often than father-present teenage girls.

5.1. Method

5.1.1. Participants

The participants were approached at the same location and time as in the pilot study and study 1. Participants were asked to participate voluntarily in this study and were again offered a bar of chocolate as a sign of gratitude for their cooperation. The sample consisted of 123 teenage girls ($M = 18.73$ years, $SD = 4.16$). The sample in this study was independent of that in study 1, consisting of a completely new sample of

teenage girls. All participants were living on Curaçao and were attending school during the period of the study. Because there were not enough father-absent girls, we could not make distinctions between girls who were abandoned by their father at various ages. Therefore, the sample was divided into teenage girls who grew up with their father (father-present girls, $n = 76$) and teenage girls who were abandoned by their father before they were 14 years old (father-absent girls, $n = 47$). Two teenage girls whose fathers had passed away were excluded from our study. A t -test showed that the two groups did not differ significantly in age $t(103) = .34$, $p = .73$. For the sake of clarity, we henceforth refer to the two groups as “father absent girls” and “father present girls.”

5.1.2. Materials and procedure

We used an observational form consisting of the eight scales developed in study 1 to assess the different non-verbal seduction strategies that teenage girls may use. This form consisted of 37 items instead of 40 because the items in the *sexy outfit* dimension were excluded on the basis of the low reliability. As mentioned earlier, we examined whether there were differences between father-absent girls and father-present girls regarding several demographic variables and physical characteristics, i.e., skin color, body figure, and hair type, which were also assessed by our observers. First, the observers were instructed to indicate if the respondents had dark, medium brown, light brown, white, or Asian skin color. Second, the observers were instructed to describe the body type by indicating if the respondent was thin, normal, or overweight. Finally, the observers were instructed to indicate the hair type of the respondents, varying from thin hair, curly hair, or natural hair. We used again the two independent observers to jointly fill out all the observation forms, and two interviewers to approach the participants. A total of seven different visits occurred, with a total observation time of approximately 60 hours. The observers were instructed to focus on one girl at the time for a maximum of 30 minutes in order to fill out the observational form. If the selected girl refused to participate in the study by not filling out the questionnaire, remained out of sight of the observer, or left before finishing the observation, observation of that participant was terminated.

The interviewers were instructed to approach the participants and to ask them whether they would participate in our study. A questionnaire was given to the participants by the interviewers. The participants could choose between a Papiamentu and Dutch version of the questionnaire. The questionnaire included a demographics section, in which questions were asked such as age, place of birth, the presence of a biological father, educational level, and safety of the neighborhood in which the participant was living. While the participant completed the questionnaire, the two observers had enough time to fill out the details on the observation forms, such as whether perfume was being worn by the participant, the presence of powder on the chest, the status of any nail care, and the use of facial make-up. After the participants had filled out the questionnaires, the observations continued.

Finally, the participants were asked to fill out the female adolescent version of the Intrasexual Competition scale (Buunk & Fisher, 2009; Buunk, Stulp, & Ormel, 2014), consisting of 10 items. Participants were

Table 2
Descriptive statistics and zero-order correlations for non-verbal seduction strategies (study 1)

Scales	M (SD)	1	2	3	4	5	6	7	8
1 Flirtation ($\alpha = .78$)	16.76 (7.05)	–							
2 Peacock ($\alpha = .73$)	6.00 (3.28)	.42**	–						
3 Restless ($\alpha = .79$)	11.41 (4.96)	.49**	.31**	–					
4 Sweet temptation ($\alpha = .83$)	7.34 (4.09)	.26*	.21	.36**	–				
5 Hairstyle & make up ($\alpha = .76$)	6.65 (3.73)	.36**	.53**	.26**	.25*	–			
6 Jewels ($\alpha = .71$)	7.88 (4.75)	.31**	.50**	.21*	.05	.32**	–		
7 Lollypop ($\alpha = .76$)	4.04 (2.41)	.22*	.28**	.14	.50**	.29**	.25*	–	
8 Nail care ($\alpha = .80$)	3.45 (2.50)	.19	.24*	.02	.16	.33**	.15	.05	–

* $p < .05$ (2-tailed).

** $p < .01$ (2-tailed).

asked to indicate on a scale from 1 (“not applicable”) to 7 (“completely applicable”) to what extent they were in agreement with the item. Examples of the items are “I can’t stand it when I meet another woman who is more attractive than I am,” “When I go out, I can’t stand it when men pay more attention to a friend of mine than to me,” “I tend to look for negative characteristics in women who are very successful,” “I want to be just a little better than other women,” and “I don’t like seeing other woman with a nicer house or nicer car than mine.”

5.2. Results

5.2.1. Differences between father-absent girls and father-present girls in potentially confounding characteristics

The observers were instructed to assess physical characteristics of the participants (e.g., skin color, body type, and hair type), and the interviewers assessed several demographic characteristics, in order to exclude possible confounds of father absence versus father presence. Chi-square analyses showed no significant differences between father absent teenage girls and father-present teenage girls regarding the following variables: educational level ($\chi^2(2) = 1.95, p = .38$), perception of safety in their neighborhood ($t(116) = .41, p = .68$), skin color ($\chi^2(4) = 3.65, p = .46$), body type ($\chi^2(4) = 6.64, p = .16$), and hair type ($\chi^2(4) = 6.45, p = .17$). These findings indicate that differences between father absent teenage girls and father-present teenage girls cannot be attributed to these variables.

5.2.2. Differences between father-absent girls and father-present girls in intrasexual competition and non-verbal seduction strategies

5.2.2.1. Intrasexual competitiveness. Our first research question asked whether father-absent teenage girls reported more intrasexual competitiveness than father-present teenage girls. A t-test showed that father-absent girls indeed reported significantly higher levels of intrasexual competitiveness than father-present girls (see also Table 3).

5.2.2.2. Non-verbal seduction strategies. The second research question asked whether father-absent teenage girls differed from father-present teenage girls in the use of non-verbal seduction strategies to attract males. Before comparing these groups, we conducted again a reliability analysis for the eight non-verbal seduction strategies from study 2. As can be seen in Table 4, the reliability analysis indicated that for five of the seven scales, the reliability was higher than .70. The exceptions were lollypop and sweet temptation. Although the reliabilities of the latter scales were lower than .70, we decided to include them in further analyses because their exclusion would be on the basis of an extremely strict criterion for an observational study. Moreover, we decided to combine the items of the scales peacock behavior ($\alpha = .47$) and jewels and accessories ($\alpha = .74$) to form a new scale (peacock behavior), given

their similarity and the strong correlation between them ($r(118) = .67, p < .01$). The Cronbach’s alpha of this new scale was higher than that of each of the two individual scales. Therefore, we decided to use the combined scale instead of the two separate scales. Next, we conducted a series of t-tests, which revealed that the non-verbal seduction scales differed significantly between the two groups, with the exception of sweet temptation and lollypop. As can be seen in Table 3, the observers rated father-absent girls generally higher than father-present girls on the non-verbal seduction strategies. That is, compared to father-present girls father-absent girls used more often hairstyles with waves and facial make-up, jewels, accessories, practiced more conspicuous nail care, and showed more often direct flirtation, peacock behavior, and active and restless behavior in the presence of males.

5.2.3. Correlations of intrasexual competitiveness with the non-verbal seduction strategies

The third research question asked whether the non-verbal seduction strategies were correlated with intrasexual competitiveness. As Table 4 shows, all correlations between intrasexual competitiveness and the non-verbal seduction strategies were significant at the .01 or .05 level with exception of lollypop, and four of the seven correlations were higher than .52. In particular, direct flirtation, peacock behavior, restless and active behavior, use of hairstyles with waves and facial make-up, and the use of conspicuous nail care were characteristic of those high in intrasexual competitiveness.

5.2.4. Mediation of intrasexual competitiveness

The fourth research question asked whether intrasexual competitiveness was a mediator between father absence and the non-verbal seduction strategies. Three conditions need to be met to perform such an analysis for a particular non-verbal seduction strategy. First, there needs to be a positive effect of father absence versus father presence on intrasexual competitiveness. Second, there needs to be a positive effect of father absence versus father presence on the non-verbal strategy. Third, there needs to be a positive correlation between intrasexual competitiveness and the non-verbal strategy. For six of the seven non-verbal seduction strategies, these conditions were met, i.e., direct flirtation, peacock behavior and the use of jewels, restless and active behavior, sweet temptation, use of hairstyles with waves and facial make-up, and nail care. Therefore, we conducted mediation analyses for these strategies. We carried out regressions by performing bootstrap analyses with each of the six relevant strategies as a dependent variable, entering father absence versus father presence first, and examining whether this effect disappeared when also entering intrasexual competitiveness. As shown in Table 5, the regression analysis demonstrated that for most non-verbal seduction strategies, the effect of father absence versus father presence disappeared or became weaker when intrasexual competitiveness was entered in the regression. Thus, intrasexual competitiveness was a significant mediator for direct flirtation, peacock behavior and the use of jewels, restless and active behavior, the use of hairstyles with waves and facial make up, and nail care. Next, for each participant, the sum of the six non-verbal seduction strategies was calculated. Fig. 1 illustrates that intrasexual competitiveness functioned as a mediator between father absence and the sum of the non-verbal seduction strategies.

6. General discussion

We hypothesized that father absence before the age of fourteen would result in a higher level of intrasexual competitiveness, and consequently, in using more non-verbal seduction strategies than having one’s father present during one’s childhood. Our results showed considerable support for these hypotheses. Preliminary analyses showed that the non-verbal strategies could be observed with a very high level of inter-item and inter-observer reliability, and that the various seductive behaviors could be reduced to eight dimensions that constituted

Table 3
Means of non-verbal seduction strategies and intrasexual competitiveness for father-absent girls and father-present girls

Scales	Father-absent girls		Father-present girls		Comparison		95% CI	CI
	M	SD	M	SD	t	d	LL	UL
Flirtation	20.20	9.29	16.35	8.63	2.21*	.43	.04	.82
Peacock	19.57	7.39	16.68	6.17	2.22*	.43	.04	.82
Restless	11.83	5.47	9.73	5.16	2.02*	.40	.01	.78
Sweet temptation	7.60	3.12	7.46	3.37	0.21	.04	-.34	.43
Hairstyle & make up	12.75	4.67	10.70	4.47	2.34*	.45	.07	.83
Lollypop	3.45	1.11	3.74	1.50	-1.11	-.26	-.63	.12
Nail care	6.05	3.07	4.65	2.71	2.50**	.49	.10	.88
Competitiveness	38.42	20.55	30.38	18.12	2.02*	.42	.00	.83

Note. d = Cohen’s d (Effect size of between group differences); 95% CI = confidence interval of Cohen’s d; LL = lower limit; UL = upper limit.

* $p < .05$ (2-tailed).

** $p < .01$ (2-tailed).

Table 4

Descriptive statistics and zero-order correlations for non-verbal seduction strategies and intrasexual competitiveness (study 2)

	Scales	M (SD)	1	2	3	4	5	6	7	8
1	Flirtation ($\alpha = .92$)	17.56 (9.01)	–							
2	Peacock ($\alpha = .81$)	9.65 (5.17)	.80**	–						
3	Restless ($\alpha = .88$)	10.41 (5.33)	.77**	.72**	–					
4	Sweet temptation ($\alpha = .38$)	7.53 (3.23)	.47**	.43**	.45**	–				
5	Hairstyle & make up ($\alpha = .83$)	11.38 (4.65)	.75**	.88**	.68**	.35**	–			
6	Lollypop ($\alpha = .50$)	3.64 (1.37)	.16	.07	.13	.29**	.09	–		
7	Nail care ($\alpha = .79$)	5.20 (2.93)	.55**	.58**	.50**	.34**	.64**	.01	–	
8	Competitiveness ($\alpha = .95$)	32.90 (19.23)	.55**	.57**	.52**	.23*	.52**	–.07	.29**	–

* $p < .05$ (2-tailed).** $p < .01$ (2-tailed).

reliable scales. The first major finding was that, as predicted, teenage girls who grew up without their father before the age of fourteen reported significantly higher levels of intrasexual competitiveness than teenage girls who grew up (during at least most of their youth) with their father. This finding is in line with our expectations, because assuming that this group follows a short-term mating strategy, they will be forced

to compete with their peers for the attention of males and will therefore view contact with other teenage girls, especially in the context of contact with the opposite sex, in competitive terms (cf. Buunk & Fisher, 2009). This higher level of intrasexual competitiveness seems a manifestation of the fast life history strategy that will be relatively more characteristic of girls who grew up without their father before the age of fourteen, than of girls whose father was present during their childhood.

A second major finding was that, again in line with our expectations, teenage girls who grew up without a father were rated higher on the majority of the non-verbal seduction scales than teenage girls who grew up with their father during at least most of their youth. To be more specific, girls who grew up without a father showed relatively more direct flirtation and peacock behavior (including the use of jewels and accessories), exhibited more restless and active behavior, used more hairstyles with waves and facial make-up, and practiced more conspicuous nail care. However, the two groups did not differ in their style of dress, such as in wearing revealing or figure-hugging clothes. This is in contrast to what might have been expected because several previous studies have shown that women use self-promotion in order to attract males by wearing form-fitting clothes (e.g., Barber, 1995; Buss, 1988; Buss & Schmitt, 1993; Fisher & Cox, 2009; Schmitt & Buss, 1996; Symons, 1979; Walters & Crawford, 1994). These findings are consistent with a life history perspective, because girls who grew up without a father are more likely to follow a fast life strategy, and will therefore be more interested in short-term mating than girls who grew up with their father, and consequently may use non-verbal seduction strategies to enhance their chances to attract mates.

Another major finding was that most non-verbal seduction strategies were more prevalent among those high in intrasexual competitiveness. Thus, these strategies can be viewed as a manifestation of competing with other girls in attracting mates. Our findings suggest that, like several other species, human females may use specific seductive signals to communicate their availability as—probably short-term—mates, and human males probably interpret these kinds of non-

Table 5

Results of mediation analysis with intrasexual competitiveness as mediator between father absence and non-verbal seduction strategies

Scales	Coefficient	SE	p	Bootstrap 95% CI
Flirtation				
Effect of father absence on NVS(c)	4.30	1.87	.02	(.49; 7.75)
Effect of father absence on NVS, controlling competitiveness (c')	2.45	1.62	.14	(–.89; 5.67)
Effect of competitiveness, controlling for father absence (b)	.24	.04	.00	(.17; .31)
Peacock				
Effect of father absence on NVS(c)	3.24	1.41	.02	(.34; 6.08)
Effect of father absence on NVS, controlling competitiveness (c')	1.85	1.17	.11	(–.58; 4.08)
Effect of competitiveness, controlling for father absence (b)	.19	.03	.00	(.13; .24)
Restless				
Effect of father absence on NVS(c)	2.72	1.14	.02	(.38; 4.93)
Effect of father absence on NVS, controlling competitiveness (c')	1.63	1.04	.11	(–.44; 3.66)
Effect of competitiveness, controlling for father absence (b)	.14	.03	.00	(.08; .18)
Sweet temptation				
Effect of father absence on NVS(c)	.42	.70	.55	(–.94; 1.83)
Effect of father absence on NVS, controlling competitiveness (c')	.08	.67	.91	(–1.26; 1.42)
Effect of competitiveness, controlling for father absence (b)	.04	.02	.02	(.01; .07)
Hairstyles & make up				
Effect of father absence on NVS(c)	2.29	.92	.02	(.40; 4.06)
Effect of father absence on NVS, controlling competitiveness (c')	1.44	.82	.09	(–.24; 3.08)
Effect of competitiveness, controlling for father absence (b)	.11	.02	.00	(.08; .15)
Nail care				
Effect of father absence on NVS(c)	1.47	.62	.03	(.20; 2.67)
Effect of father absence on NVS, controlling competitiveness (c')	1.14	.62	.07	(–.13; 2.34)
Effect of competitiveness, controlling for father absence (b)	.04	.02	.02	(.00; .07)
Sum of the non-verbal seduction strategies				
Effect of father absence on NVS(c)	2.69	1.02	.01	(.63; 4.86)
Effect of father absence on NVS, controlling competitiveness (c')	1.59	.86	.07	(–.09; 3.31)
Effect of competitiveness, controlling for father absence (b)	.13	.02	.00	(.09; .17)

Note. The coefficients represent unstandardized regression coefficients; NVS = non-verbal seduction strategies.

Fig. 1. Intrasexual competition as a mediator between father absence and the sum of non-verbal seduction strategies. Note. Results of the regression analysis showing that the effect of the sum of non-verbal seduction strategies is mediated by intrasexual competitiveness; c path = direct unmediated path from father absence (IV) to the sum of the non-verbal seduction strategies (henceforth referred as SNVS); c prime path (c') = direct mediated path from father absence (IV) to SNVS (DV) after controlling for the effect of intrasexual competitiveness (the mediator); a path = path from father absence (IV) to intrasexual competitiveness (mediator); b path = path from intrasexual competitiveness (mediator) to SNVS (DV); * $p < .05$ (2-tailed), ** $p < .01$ (2-tailed).

verbal seduction signals to select those girls who are available for short-term mating. Furthermore, the results showed that intrasexual competitiveness acted as a mediator between father absence versus father presence and most non-verbal seduction strategies (i.e., the expression of direct flirtation, peacock behavior and the use of jewels, restless and active behavior, the use of hairstyles with waves and facial make-up, and nail care). That is, we demonstrated that father absence leads in general to the use of non-verbal seduction strategies because father absence tends to make girls more competitive toward other girls.

The present research has a number of strengths. First, as far as we could ascertain, this is the first study to show an effect of father absence upon non-verbal seduction strategies. In fact, life history and mating studies have rarely used behavioral observational data. Second, this research was not limited to poor inner-city women like many studies in the United States on the effects of father absence, but was executed in a unique setting (i.e., the island of Curaçao), with a predominantly Afro-Caribbean population where father absence is more or less normal. Third, both groups did not differ in educational level, the perception of safety in their neighborhood, racial characteristics (i.e., skin color), and physical characteristics such as body and hair type. Therefore, these characteristics cannot explain the differences between the groups. Fourth, this is the first study showing that non-verbal seduction strategies may stem to a large extent from intrasexual competitiveness, that is, from the intention to “defeat” other girls in the mating game.

Despite these strong points, the present research also has a number of limitations. First, we did not assess the motivations the teenage girls had for their non-verbal behaviors. For example, we do not know if there is an association between the various non-verbal seduction strategies and interest in short-term mating or a fast life history strategy. It is therefore not obvious if an interest in short-term mating or in early reproduction partially underpinned the effects we found. Similarly, we do not know how the boys interpreted the non-verbal seduction strategies of the girls, and if their interest in girls showing seductive behavior was related to an interest in short-term mating. This is an important issue for future research. A second limitation is that we do not know *why* father absence induces more intrasexual competitiveness in teenage girls. It may be due to the expectation of father-absent girls that males are not reliable investors, and that one therefore should reproduce early to ascertain the support of one's mother (cf. Nettle, 2009). The seductive behavior may also be due to a lack of paternal control of the mating behavior of daughters, when the father is absent (cf. Dubbs, Buunk, & Li, 2012). Previous research has indeed shown empirical support for the so-called daughter-guarding hypothesis. According to this hypothesis, fathers may be intensively involved in monitoring the sexual behavior of their daughters (e.g., Flinn, 1988; Perilloux, Fleischman, & Buss, 2008). As such, girls who grew up without a father may have experienced less control than girls who grew up with a father. The former may therefore have more opportunity to use non-verbal seduction strategies to attract males. However, this hypothesis cannot explain why girls who grew up without a father were higher in intrasexual competitiveness than girls who grew up with a father. A third limitation of our study is that we did not make a distinction in our analysis regarding the age of abandonment among girls who grew up without a father, while previous studies have shown that a father's abandonment at an early age may particularly strongly shape the expectations of adult reproductive options (e.g., Belsky et al., 1991). Fourth, the limitations of mediation are well documented (e.g., Bullock, Green, & Ha, 2010; MacKinnon, Krull, & Lockwood, 2000; MacKinnon & Pirlott, 2015), and therefore our mediation paths can be considered only as indications of causality.

Despite these limitations, our findings are important for several reasons. As far as we know, we have for the first time demonstrated that teenage girls may use various observable non-verbal seduction strategies to attract males. Second, we have also demonstrated that teenage girls who grew up without a father report more intrasexual competitiveness than teenage girls who grew up with a father. Third, we have

shown that intrasexual competitiveness may explain the effect of father absence on the expression of non-verbal seduction strategies to attract males. Our findings contribute to life history theory, and also highlight the importance of the role of fathers regarding the mating strategies of their daughters.

Acknowledgements

We are grateful to Auronette Girigori, former employee of the University of Curaçao, Dr. Moises da Costa Gomez, who functioned as one of the observers. We want also to thank our two interviewers for their cooperation and dedication. Without their help, we could not have conducted our observational studies.

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