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Gender-Identity, Body-Experience, Sexuality, and the Wish for Having Children in DES-Daughters

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ABSTRACT. The main focus of the present study is to examine the impact of being a DES-daughter upon gender-identity, body-experience, body-acceptance, sexual satisfaction, and the wish for having children. Subjects were DES-daughters ($N = 206$) and age-matched controls ($N = 121$) who were not prenatally exposed to DES. All subjects completed a battery of measures including Bem's Sex Role Inventory (1977), a written gynecological anamnesis, and questionnaires concerning body-experience, sexuality, and the wish for having children. First, it was expected that DES-daughters would be more masculinized in their self-concepts than non-exposed control subjects. Our second hypothesis was that DES-daughters would be lower in body-acceptance and sexual satisfaction, and would have stronger wishes and more emotionality concerning reproduction. Contrary to expectations, DES-daughters were not more 'masculinized' than controls. Instead, they tended to have higher scores on femininity. Furthermore, no differences between DES-daughters and controls appeared in body-acceptance and sexual satisfaction. However, the DES-daughters reported a stronger wish for having children and expressed more emotionality concerning the subject. *[Article copies available from The Haworth Document Delivery Service: 1-800-342-9678. E-mail address: getinfo@haworth.com]*

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We are indebted to the Dutch DES Action Centre for providing us the sample of DES-daughters.

Diethylstilbestrol (DES) was administered to pregnant women from 1947 until 1971 in the United States and until 1975 in the Netherlands in order to maintain at-risk pregnancies and to promote fetal well-being in normal pregnancies. As early as 1953, Dieckmann, Davind, Rynkiewicz, and Pottinger published findings refuting the efficacy of DES. Nevertheless, the drug continued to be dispensed to hundreds of thousands of women. For instance, in the United States 4.8 million pregnant women were treated with DES (Edelman, 1986; Orenberg, 1981; Palmlund, Apfel, Buitendijk, Cabau, & Forsberg, 1993). In the Netherlands, DES was used in more than 150,000 pregnancies in order to prevent miscarriages. For France and the United Kingdom, the estimated numbers of exposed pregnancies are 200,000 and 800,000, respectively (Palmlund et al., 1993).

In 1971, evidence became available that prenatal DES-exposure was associated with enhanced risk of clear-cell adenocarcinoma of the vagina of female offspring (Herbst, Ulfelder, & Poskanzer, 1971). Upon further investigation, DES-daughters also appeared to be at higher risks for adenosis (O'Brien et al., 1979), structural abnormalities of the genital tract (Kaufman, Binder, Gray, & Adam, 1977; Marselos & Tomatis, 1992; Noller, Townsend, & Kaufman, 1981; Stillman, 1982), fertility- and pregnancy-problems (Barnes et al., 1980), and cervical cancer (Robboy et al., 1984). In addition, Wingard and Turiel (1988) found some evidence suggesting a harmful effect of DES upon the human immune system.

Psychological consequences that have been investigated until now, concerned the DES-daughters' levels of distress, their mental health and well-being, coping styles, and their relationships with their mothers. Some of the main findings will be reviewed here.

DES-daughters appeared to experience worry, upset and anger when becoming aware of their DES-exposure (Cloitre, Ehrhardt, Veridiano, & Meyer-Bahlburg, 1988; Zalmstra, 't Hoen, & Visser, 1986), even after 6.5 years (Cloitre et al., 1988). The most consistently found consequences of DES-exposure for mental health seem to be depression and anxiety: both occur significantly more in DES-daughters than in non-exposed controls (Ehrhardt et al., 1987; Fried-Cassorla et al., 1987; Meyer-Bahlburg et al., 1985; Vessey, Fairweather, Norman-Smith, & Buckley, 1983). Burke and colleagues

(1980) evaluated the women's overall response as a normal reaction to a massive trauma. In addition, about 30% of the DES-daughters experienced anger at their mothers when they detected their exposure. These feelings, however, mostly subsided over time (Burke et al., 1980; Cloitre et al., 1988). Finally, it was found that guilt is a central feeling of the mothers, for whom the DES-exposure of their offspring increases their vulnerability to subsequent stressors in their lives (Gutterman, Ehrhardt, Markowitz, & Link, 1985).

An additional topic receiving extensive research attention was the relationship between prenatal DES exposure and gender-related behavior (Ehrhardt et al., 1985; 1989; Lish et al., 1991; Lish, Meyer-Bahlburg, Ehrhardt, Travis, & Veridiano, 1992; Meyer-Bahlburg et al., 1984; Newbold, 1993; Yalom, Green, & Fisk, 1973). One of the leading questions concerned the hypothesized masculinizing effect of DES upon female behavior and identity. This hypothesis was partly derived from animal studies which demonstrated that administration of estrogens, including DES, had a masculinizing effect on some aspects of sexual behavior of male rats, if exposure occurred during critical stages of development (see Newbold, 1993). In addition, prenatal or perinatal DES seemed to alter features of sex-dimorphic juvenile social play in female rats, and to increase masculine, so-called 'mounting' behavior while decreasing feminine 'lordosis' in adult female guinea pigs. Clearly, not only is generalizing findings derived from animal studies to the human condition problematic, there is also a huge gap between sex-specific sexual behavior in certain animal species and femininity and masculinity in humans.

The existing research on DES-daughters' gender behavior is mixed. Ehrhardt and colleagues (1989) requested 30 DES-daughters to report retrospectively about their sex-role behavior when they were children. Compared to controls, DES-daughters reported a less strong preference for maternal parenting. In contrast to the controls, they also liked older children more than babies and toddlers. However, no consistent group differences were found in other presumed gender-role behaviors such as rough-and-tumble play. A replication by Lish and co-workers (1991) failed to confirm the differences between the DES-daughters ($N = 30$) and the controls ($N = 30$), although a higher percentage of the DES-daughters re-

ported that they had been labelled as tomboys in childhood. Based upon a larger data set of 60 DES-daughters and 26 controls, Lish and colleagues (1992) conclude that the "vast majority of DES-exposed girls and women (. . .) do not show increased masculine or decreased feminine gender-role behavior" (p. 440).

In addition to (self-reported) sex-role *behavior*, some of the studies mentioned above also investigated the DES-daughters' gender-*identity*, the extent to which the subject's self-concept is sex-typed (Bem, 1974, 1977; Spence, 1993). Ehrhardt and co-workers (1979) did not find differences between DES-daughters and controls on Bem's (1974) Masculinity scale, but a trend towards lower scores in DES-daughters on the Femininity scale ($p = 0.09$), while others (Lish et al., 1991) failed to find any differences at all. In conclusion, the impact of DES on gender-identity is still unknown.

AIMS OF THE PRESENT STUDY

First, our study was aimed at examining the *specific DES-related medical characteristics* of our respondents. We wanted to know whether the DES-related medical consequences in our sample were similar to those reported in the literature. Also, we paid attention to how DES-daughters *experience* their specific actual and future physical/medical condition.

A second aim of the present study was to further clarify the relationship between being a DES-daughter and gender-identity. As can be concluded from the formulation "being a DES-daughter," our focus was not primarily on the direct consequences of prenatal DES-exposure. We prefer the term *being a DES-daughter*, to emphasize possible consequences of prenatal DES-exposure (that can never be studied exclusively), but also the effects of the specific, postnatal medical, psychological, and social experiences. As other authors (e.g., Newbold, 1993) before us, we want to warn against a too narrow-focused conceptual model that linearly connects prenatal DES-exposure to later behavior, for instance, sex-role behavior and psychological experience. We consider the self-concept a crucial variable in the context of physical and mental health (cf. Taylor, 1995). We were interested in DES-daughters' gender-identity primarily because of empirical reasons, namely

the indications mentioned before that DES could have masculinizing effects. Bem's Sex Role Inventory (BSRI; Bem, 1974, 1977), which was used in the studies by Ehrhardt et al. (1979) and Lish et al. (1991), was applied for testing the hypothesis that DES-daughters are more masculine in their self-concepts than normal controls.

A third aim of the present study was to explore whether DES-daughters differ from controls in body-experience and -acceptance, and sexuality. As said before, DES exposure may have a serious impact on the female sexual and reproductive organs, that is, on those bodily parts and functions that are most distinguishing for femininity. This led us to examine psychological variables reflecting the ways in which women experience these areas of their bodies, i.e., body-experience (attitude towards their own body) and body-acceptance (degree in which the subject accepts [parts of] her own body), and sexuality. Shafer, Irwin, Adler, and Crittenden (1984) found that DES-daughters, if asked to draw themselves (Draw Yourself Test), emphasized their heads or facial features and tended to omit or to obscure body parts depicting sexual characteristics such as their breasts and genital areas. Meyer-Bahlburg et al. (1985) have reported that DES-daughters compared with controls were lower in sexual desire, enjoyment, and excitability, had less orgasms, and more negative feelings during sex. However, these studies were based upon small samples. The overall hypothesis in the present study was that DES-daughters experience more problems with respect to these variables than controls. More precisely, we expected DES-daughters to have lower scores on body-experience and -acceptance and sexuality (frequency and satisfaction).

Fourth, we wanted to investigate the DES-daughters' wishes and emotions with respect to reproduction. We assumed that DES-daughters are aware of reproductive difficulties in adulthood and that they anticipate infertility at a younger age. Therefore, our hypothesis was that DES-daughters compared with non-exposed controls would have stronger wishes and experience more emotional feelings concerning reproduction.

METHOD

Subjects and Procedures

The present study was conducted in cooperation with the Dutch DES Action Centre, which asked a random selection of 500 members to participate. Three-hundred and six DES-daughters (61.2%) were willing to participate. However, 100 of these women were not completely sure whether they had indeed been prenatally exposed to DES. For another 47 cases participation was not possible due to such factors as having a mental handicap, living abroad, etc., leaving 206 DES-daughters who participated.

All DES-respondents (mean age of 31.19 years; age range 20 to 47 years) were asked to provide the name of an age-matched control-subject. This procedure resulted in the participation of 91 controls. Another 30 controls were recruited from a pool of volunteer research participants at Tilburg University. Thus, a total of 121 controls participated (mean age of 32.01 years, age range 19 to 50 years). The match between both groups was highly satisfying. The marital status of both groups was almost equal: 73% were married, 23% were unmarried, 3% of the DES-daughters and 2% of the controls were divorced; and 1% (DES-daughters) and 2% (controls) consisted of widows. Also, with respect to having children, both groups were highly similar: 43.5% of the DES-daughters and 48.7% of the controls had children. The educational level of both groups was also similar: on a continuum from 0 (*low*) to 4 (*high*), mean educational levels were 2.79 and 2.80 for the DES-daughters and controls, respectively. Only with respect to one demographic variable, employment-rate, a between-group difference appeared: 62% of the DES-daughters were employed versus 73% of the controls. A z-test for the difference between proportions showed that this difference was significant ($z = -2.52, p < .01$).

Measures

Specific Medical DES-Problems and Gynecological Anamnesis. This checklist of DES-specific medical problems, including adeno-sis, fertility problems and unwanted childlessness (see Table 1), was

TABLE 1. Medical Symptoms in DES-Daughters and Controls

Symptoms	DES %	Controls %	Significance of the difference
Abnormal smear	25.6	3.3	$p < .01$
Acne	21.3	20.0	$p = .78$
Adenosis	46.8	—	$p < .01$
Clear cell carcinoma	.5	—	$p = .44$
Delivery problems	18.3	12.5	$p = .17$
Deviant form of cervix	37.9	.8	$p < .01$
Early stage cervix cancer	3.9	.8	$p = .10$
Ectopic pregnancy(ies)	6.4	.8	$p < .05$
Excessive growth of hair	17.8	7.5	$p < .01$
Fear of unwanted childlessness	47.8	8.3	$p < .01$
Irregular menstruation	32.2	19.2	$p = .01$
Miscarriage(s)	20.2	11.7	$p < .05$
Painful menstruation	48.0	31.7	$p = .01$
Pregnancy problems	16.7	9.2	$p = .07$
Premature birth(s)	20.2	3.3	$p < .01$
Unwanted childlessness	13.3	4.2	$p < .01$

constructed on the basis of descriptions from the literature. Subjects have to check whether they have experienced the symptoms themselves at any times in their lives, and they have to answer this by *yes* or *no*. In addition, they are asked to rate the frequency of gynecological examinations and to report how they have experienced these.

Bem's Sex Role Inventory (BSRI; Bem, 1974, 1977). This 60-item questionnaire measures femininity and masculinity. Twenty

items are buffer-items. Subjects are requested to rate on 7-point scales how well the adjectives such as Sensitive, Dominant, etc., characterize themselves, the scoring categories varying from *very to not at all*. Depending upon their scores on the Masculinity scale (high-low) and the Femininity scale (high-low), subjects can, by means of the median-split method, be divided into one of four categories, namely *Feminine* (high Femininity, low Masculinity), *Masculine* (low Femininity, high Masculinity), *Androgynous* (both high), and *Gender-Aschematic* (both low). The internal consistency of the BSRI (Cronbach's alpha) is $\alpha = .78$ (Femininity, both sexes), and $\alpha = .86$ and $\alpha = .87$ (Masculinity, females and males, respectively) (Bem, 1981).

Body-Experience. This 7-item questionnaire contains items such as "I can hardly believe that I am physically attractive," "My own body can feel strange to me," etc. A 7-point scale is used, ranging from *Absolutely not fitting me* to *Fits me completely*. The items focus on feelings of physical attractiveness and of alienation towards one's own body. Existing measures have mainly been developed in the context of eating disorders, and thus contain many items concerning body weight and shape (cf. Ben-Tovim & Walker, 1991), aspects that were not primarily relevant in our study. In addition, alienation towards one's own body is not reflected in existing measures for body-experience. Therefore, we decided to construct our own measure for the purpose of this study. The reliability (Cronbach's alpha) of the Body-Experience Scale was $\alpha = .83$.

Body-Acceptance. In this questionnaire, subjects have to express their feelings with respect to their body by rating each of 18 parts of the female body (hair, breasts, vagina, labia, clitoris, etc.) on 5-point scales, ranging from *Very positive* to *Very negative*. This questionnaire was especially developed for the present study, because existing scales using the same procedure (e.g., Rauste-Von Wright, 1989) do not include specific female genitals, the relevant bodily parts for the present study (see *Aims of the study*). The reliability (Cronbach's alpha) of this scale appeared to be $\alpha = .89$.

Sexuality. This scale consists of two items, one concerning the frequency of making love (4-point scale, ranging from *never to often*), one concerning sexual satisfaction (4-point scale, ranging

from *satisfying* to *not satisfying*), respectively. The reliability (Cronbach's alpha) of this scale was $\alpha = .77$.

The Wish to Have (More) Children. This questionnaire consists of three items; one about the actual number of children; one about the wish to have (more) children ("Would you like to have (more) children?") to be answered on a 4-point scale, ranging from *Yes, very much* to *No, not at all*; and one forced-choice item about the emotional impact of the subject of having children ("How far does the subject of having children have an emotional impact on you?") on a 4-point scale, ranging from *Not at all* to *Very much*. Reliability information is not provided because we examined mean differences between the groups per item.

RESULTS

In this section, the results will be presented in the following sequence: medical DES-related symptoms; gender-identity; body-experience, body-acceptance, and sexuality; desire for having (more) children.

Medical Symptoms

Table 1 shows the medical characteristics of the DES-daughters and the controls. Chi-square testing showed significant differences ($p < .05$) between the DES-daughters and the controls on almost all DES-relevant medical problems. With respect to acne, clear cell carcinoma, delivery problems, early stage cervix cancer, and pregnancy problems ($p = .07$), no significant between-group differences appeared.

Gender-Identity

In order to investigate the relationship between being a DES-daughter and gender-identity in DES-daughters, the BSRI-scores of the DES-daughters were compared to those of the controls. First, the means of the raw scores on Masculinity and Femininity of both groups were compared by a *t*-test. No significant differences on

Masculinity appeared between both groups, though the DES-daughters tended to have slightly higher scores on Femininity.

Secondly, we applied the revised way of scoring the BSRI (cf. Bem, 1977; see Measures) categorizing the subjects as Masculine, Feminine, Androgynous, or Gender-Aschematic. The medians of the raw Femininity- and Masculinity-scores were determined by taking the DES-daughters and the controls together. Table 2 shows the proportions of DES-daughters and controls in the categories Masculine, Feminine, Androgynous, and Gender-Aschematic. Subjects in both groups were most likely Gender-Aschematic, then Androgynous, then Feminine, and least likely Masculine.

Chi-square testing showed that the division of the categories was different for the DES-daughters compared to the controls ($\chi^2(3) = 8.33, p < .05$). Compared to controls, more DES-daughters were categorized within the Femininity category and less DES-daughters were categorized within the Gender-Aschematic category (see Table 2).

As the differences between DES-daughters and controls appeared specifically in the Femininity (high femininity, raw scores) and Gender-Aschematic (low femininity, raw scores) categories, we also examined the presence of interaction effects between 'being a DES-daughter' and Femininity. Chi-square analyses revealed a marginal interaction effect ($p = .07$) between 'being a DES-daughter or not' and Femininity. Of the DES-daughters, 55.2% scored themselves as Feminine, and 44.8% as not Feminine, whereas the ratio Feminine-not Feminine for the controls was the reverse, namely 44.6% versus 55.4%. Assuming that there could be a relationship between femininity and being employed, we investigated whether the difference in Femininity could be explained by the fact that more controls than DES-daughters were employed. Therefore, the

TABLE 2. Percentages of DES-Daughters and Controls in the Categories Masculine, Feminine, Androgynous, and Gender-Aschematic

	Feminine %	Masculine %	Androgynous %	Gender-Aschematic %
DES-daughters	27.1	13.8	28.1	31.0
Controls	17.4	9.9	27.3	45.5

analyses were repeated for employed and unemployed women separately. The percentages just described were virtually identical for employed and unemployed women separately.

Body-Experience, Body-Acceptance, and Sexuality

No between-group differences were found on the measures of body-experience, body-acceptance, and sexuality (frequency and satisfaction). Mean body-experience scores in both groups were 5.30 ($SD = 1.9$) and 5.31 ($SD = 1.9$) for DES-daughters and controls, respectively; mean body-acceptance scores were 2.19 ($SD = 1.07$) and 2.13 ($SD = 0.93$). Sexuality yielded mean scores of 3.25 ($SD = 1.66$) and 2.97 ($SD = 1.52$) for DES-daughters and controls, respectively.

Desire for (More) Children

Table 3 shows the mean scores (and standard-deviations) of DES-daughters and controls on Desire for having (more) children and the Emotional impact of this issue. Compared with the controls, the DES-daughters appeared to have a stronger desire for (more) children. A *t*-test showed that the difference was significant ($p < .05$).

Furthermore, the emotional impact of the subject of having children appeared to be significantly more intense for the DES-daughters than for the controls ($p < .01$). This effect was maintained after statistical correction for the variable 'having children', by applying an ANOVA with 'having children' as a covariate.

TABLE 3. Desire for (More) Children and Emotional Impact of the Subject of Having Children: Means and Standard Deviations (Between Brackets)

Scale	DES	Control
Desire for children*	2.98 (1.19)	2.68 (1.21)
Emotional impact*	2.48 (1.08)	1.79 (.94)

* Rated on a scale from (1) low to (4) high

DISCUSSION AND CONCLUSIONS

In this section, the meaning of our findings will be discussed concerning, respectively, gender-identity; body-experience, body-acceptance and sexuality; and wish for having (more) children.

Gender-Identity

One of the aims of this study was to further clarify the relationship between being a DES-daughter and gender-identity. Like Ehrhardt et al. (1989) and Lish et al. (1991), we also found that the DES-daughters' self-concept was not more 'masculinized' than the self-concept of the controls. In contrast, the DES-daughters in this study even tended to score higher on Femininity. Compared to controls, more DES-daughters appeared to describe themselves in terms of feminine adjectives. One may wonder how these discrepant findings have to be interpreted. One could argue that DES-daughters may have a special interest in seeing and presenting themselves as more feminine, reacting to (actual or future) physical characteristics like excessive growth of hair or reproductive difficulties. Also, it could be speculated that especially those individuals who are members of a DES Action Group have a tendency towards a more feminine way of self-presentation because of their awareness of current stereotypes about the (masculinizing) impact of DES. However, we do not think that the BSRI-scores could have been affected by such a self-presentation, because this questionnaire is generally considered to be an unobtrusive measure; subjects are not made aware that they are judging themselves in terms of masculinity or femininity.

We conclude that being a DES-daughter generally does not affect the self-concept in terms of masculine and feminine traits.

Body-Experience, Body-Acceptance and Sexuality

Also worth considering in the context of previous studies is our finding that no differences between DES-daughters and controls appeared in body-experience and -acceptance, nor in sexual satisfaction. As stated earlier, Shafer et al. (1984) found a tendency in

DES-daughters to obscure or to omit their breasts and genital areas while performing the Draw Yourself Test. We asked our subjects to explicitly express their feelings towards these particular parts of their bodies, and did not find any differences. These findings were supported by the fact that on the Body-Experience Scale no difference appeared between both groups. It must be noted that in Shafer et al.'s (1984) study only 25 DES-daughters participated. Furthermore, not enough information was provided to determine how many of these women had the tendency to obscure breasts and genitals. Moreover, the 25 women were partly subjects with a history of physician-diagnosed symptoms of DES exposure, and may for that reason have been suffering from specific, more serious DES-related medical complaints. We think that our sample of DES-daughters is likely to be more representative for DES-daughters in general. Therefore, we conclude that for DES-daughters *as a group* (similar to a nonclinical sample, including women *without* severe medical symptoms), body-acceptance and -experience do not seem to have a special significance.

This same conclusion may apply to sexuality, the other variable on which, contrary to the results of Meyer-Bahlburg et al. (1985), no between-group difference appeared. Also in this case, the discrepancy in findings may be due to sample characteristics. In the study of Meyer-Bahlburg et al. (1985), 30 DES-daughters participated, all selected from a DES screening clinic, from which a much higher than usual number (90%) showed vaginal adenosis, in most cases associated with several structural deformities. Although our DES-sample, compared with the controls, also showed significant differences in frequency of adenosis and deviant forms of the cervix (see Table 1), the percentage of DES-daughters without these symptoms is much higher. Hence, we tend to conclude that DES-daughters in general do not have problems in experiencing sexual pleasure.

Wish for Having (More) Children

A striking result was that the DES-daughters demonstrated a stronger wish for having (more) children and also reported to be more emotional concerning this subject. This effect was maintained if the variable 'having children' was taken into account. These find-

ings suggest that reproductive difficulties are a substantial source of distress for DES-daughters and deserve more attention from researchers than has been the case hitherto. Although the DES-daughters and the controls in our study were highly similar in having children, significantly more DES-daughters had been frustrated in their wish for having (more) children and had been suffering fear of unwanted childlessness. This fear is highly comprehensible in the light of the many actual and past problems concerning reproduction of the DES-daughters, but also in the context of these women's awareness of their (anticipated) specific medical and physical condition. It seems plausible that the strong emotional impact of the issue of having children for DES-daughters that we found, can mainly be attributed to their (fear of) fertility and pregnancy problems.

What is the precise nature of DES-daughters' emotionality concerning the subject of having children, and what are its consequences? What is the relationship between fearful anticipation of childlessness and attitudes towards having children? What is the role of health care in DES-daughters' fear of unwanted childlessness and in their emotionality concerning the subject of having children? Is the psychological impact of experiencing reproductive difficulties different for DES-daughters with these difficulties, if compared to women who have to cope with the same medical problems without having been exposed to DES? These all are questions that deserve attention in future research.

In addition, we would like to note that we did not succeed in collecting data with respect to the exact period and doses of prenatal DES exposure. There may be a dose-response relationship, in principle with respect to all variables we used, but from our data we cannot determine this. Animal research has yielded findings suggesting the existence of critical stages during the fetal development associated with increased risk of effects of DES on sexual development (Newbold, 1993). It seems reasonable to assume that women seeking professional help for DES-related medical problems, may have been exposed either for a longer period or more intensely. Enhanced risk, either as a direct consequence of exposure or indirectly due to the severe medical symptoms, of distress and of psychiatric problems is obvious.

The psychological research that had been done shortly after the harmful physical consequences of prenatal DES exposure had become known, was aimed at a broad range of variables (for overviews, see Newbold, 1993; Reinisch, Ziemba-Davis, & Sanders, 1991). In line with this research, our study also shows that many psychological variables do not have specific meanings for DES-daughters; no significant differences between DES-daughters and non-exposed controls appeared in gender-identity, body-experience and -acceptance, and sexuality. Certainly, this does not necessarily mean that being a DES-daughter has no significant psychological impact in terms of these variables in *specific* subgroups of DES-daughters, such as those who cope with infertility or cancer. However, our results, based upon a rather representative group of DES-daughters, (that is, not [only] those seeking assistance for DES-related physical problems) support the hypothesis that DES-daughters in general may not be more vulnerable to the range of psychological consequences as was initially supposed, in any case as far as gender-identity, body-acceptance and -experience, and sexuality are concerned. With respect to these variables, they do not really seem to differ from "normal" women. Nevertheless, other consequences, such as the short-term and long-term distress (Cloitre et al., 1988) and anxiety and depression (Burke et al., 1980; Ehrhardt et al., 1987; Fried-Cassorla et al., 1987; Meyer-Bahlburg et al., 1985; Vessey et al., 1983) are serious enough to deserve attention. Our study added one other important psychological effect of being a DES-daughter by showing that the wish for having children has a significant meaning for DES-daughters. We think the time is ripe to leave the broad-spectrum research on DES and to start more in-depth studies on those psychological aspects of being a DES-daughter which seem to form a core of the problems of *DES-daughters as a group*, namely their desire for children and coping with anticipated or actual DES-related fertility and pregnancy problems, in relation to their feelings of distress, anxiety and depression. For future research on *specific subgroups of DES-daughters*, we advise making comparisons with control groups with similar problems (e.g., infertility, cancer) which are not caused by DES.

REFERENCES

- Barnes, A.B., Colton, T., Gundersen, J., Noller, K.L., Tilley, B.C., Strama, T., Townsend, D.E., Hatab, P., & O'Brien, P.C. (1980). Fertility and outcome of pregnancy in women exposed in utero to diethylstilbestrol. *New England Journal of Medicine*, *302*, 609-613.
- Bem, S.L. (1974). The measurement of psychological androgyny. *Journal of Consulting and Clinical Psychology*, *42*, 155-162.
- Bem, S.L. (1977). On the utility of alternative procedures for assessing psychological androgyny. *Journal of Consulting and Clinical Psychology*, *45*, 196-205.
- Bem, S.L. (1981). *Bem Sex-Role Inventory; Professional manual*. Palo Alto: Consulting Psychologists Press.
- Ben-Tovim, D.I., & Walker, M.K. (1991). The development of the Ben-Tovim Walker Body Attitudes Questionnaire (BAQ), a new measure of women's attitudes towards their own bodies. *Psychological Medicine*, *21*, 775-784.
- Burke, L., Apfel, R.J., Fisher, S., & Shaw, J. (1980). Observations on the psychological impact of diethylstilbestrol exposure and suggestions of management. *Journal of Reproductive Medicine*, *24*, 99-102.
- Cloitre, M., Ehrhardt, A.A., Veridiano, N.P., & Meyer-Bahlburg, H.F.L. (1988). The psychological impact of prenatal DES exposure in women: A comparison of short-term and long-term effects. *Journal of Psychosomatic Obstetrics and Gynaecology*, *8*, 149-168.
- Edelman, D.A. (1986). *DES/Diethylstilbestrol—new perspectives*. Boston, MA: MTP Press Limited.
- Ehrhardt, A.A., Feldman, J.F., Rosen, L.R., Meyer-Bahlburg, H.F.L., Gruen, R., Veridiano, N.P., Endicott, J., & Cohen, P. (1987). Psychopathology in prenatally DES-exposed females: Current and lifetime adjustment. *Psychosomatic Medicine*, *49*, 183-196.
- Ehrhardt, A.A., Meyer-Bahlburg, H.F.L., Rosen, L.R., Feldman, J.F., Veridiano, N.P., Zimmerman, I., & McEwen, B.S. (1985). Sexual orientation after prenatal exposure to exogenous estrogen. *Archives of Sexual Behavior*, *14*, 57-77.
- Ehrhardt, A.A., Meyer-Bahlburg, H.F.L., Rosen, L.R., Feldman, J.F., Veridiano, N.P., Zimmerman, I., & McEwen, B.S. (1989). The development of gender-related behavior in females following prenatal exposure to diethylstilbestrol (DES). *Hormones and Behavior*, *23*, 526-541.
- Fried-Cassorla, M., Scholl, T.O., Borow, L.D. et al. (1987). Depression of diethylstilbestrol exposure in women. *Journal of Reproductive Medicine*, *32*, 847-850.
- Gutterman, E.M., Ehrhardt, A.A., Markowitz, J.S., & Link, B.G. (1985). Vulnerability to stress among women with in utero diethylstilbestrol (DES) exposed daughters. *Journal of Human Stress*, *11*, 103-110.
- Herbst, A.L., Ulfelder, H., & Poskanzer, D.C. (1971). Adenocarcinoma of the vagina. Association of maternal stilbestrol therapy with tumor appearance in young women. *New England Journal of Medicine*, *284*, 878-881.
- Kaufman, R.H., Binder, G.L., Gray, P.M., & Adam, E. (1977). Upper genital tract

- changes associated with exposure in utero to diethylstilbestrol. *American Journal of Obstetrics and Gynecology*, 128, 51-59.
- Lish, J.D., Ehrhardt, A.A., Meyer-Bahlburg, H.F.L., Rosen, L.R., Gruen, R.S., & Veridiano, N.P. (1991). Gender-related behavior development in females exposed to diethylstilbestrol (DES) in utero: An attempted replication. *Journal of the American Academy of Child Adolescent Psychiatry*, 30, 29-37.
- Lish, J.D., Meyer-Bahlburg, H.F.L., Ehrhardt, A.A., Travis, B.G., & Veridiano, N.P. (1992). Prenatal exposure to diethylstilbestrol (DES): Childhood play behavior and adult gender-role behavior in women. *Archives of Sexual Behavior*, 21, 423-441.
- Marselos, M., & Tomatis, L. (1992). Diethylstilboestrol: I, Pharmacology, toxicology and carcinogenicity in humans. *European Journal of Cancer*, 28A, 1182-1189.
- Meyer-Bahlburg, H.F.L., Ehrhardt, A.A., Endicott, J., Veridiano, N.P., Whitehead, E.D., & Vann, F.H. (1985). Depression in adults with a history of prenatal DES exposure. *Psychopharmacological Bulletin*, 21, 686-689.
- Meyer-Bahlburg, H.F.L., Ehrhardt, A.A., Rosen, L.R., Feldman, J.F., Veridiano, N.P., Zimmerman, I., & McEwen, B.S. (1984). Psychosexual milestones in women prenatally exposed to diethylstilbestrol. *Hormones and Behavior*, 18, 359-366.
- Newbold, R.R. (1993). Gender-related behavior in women exposed prenatally to diethylstilbestrol. *Environmental Health Perspectives*, 101, 208-213.
- Noller, K.L., Townsend, D.E., & Kaufman, R.H. (1981). Genital findings, colposcopic evaluation, and current management of the diethylstilbestrol-exposed female. In: A.L. Herbst & H.A. Bern (Eds.), *Developmental effects of diethylstilbestrol (DES) in pregnancy*, pp. 81-102. New York: Thieme-Stratton.
- O'Brien, P.C., Noller, K.L., Robboy, S.J., Barnes, A.B., Kaufman, R.H., Tilley, B.C., & Townsend, D.E. (1979). Vaginal epithelial changes in young women enrolled in the National Cooperative Diethylstilbestrol Adenosis (DESAD) Project. *Obstetrics and Gynecology*, 53, 300-308.
- Orenberg, C.L. (1981). *DES: The complete story*. New York: St. Martin's Press.
- Palmlund, I., Apfel, R., Buitendijk, S., Cabau, A., & Forsberg, J.G. (1993). Effects of diethylstilbestrol (DES) medication during pregnancy: Report from a symposium at the 10th International Congress of ISPOG. *Journal of Psychosomatic Obstetrics and Gynecology*, 14, 71-80.
- Rauste-Von Wright, M. (1989). Body image satisfaction in adolescent girls and boys: A longitudinal study. *Journal of Youth and Adolescence*, 18, 71-83.
- Reinisch, J.M., Ziemba-Davis, M., & Sanders, S.A. (1991). Hormonal contributions to sexually dimorphic behavioral development in humans. *Psychoneuroendocrinology*, 16, 213-278.
- Robboy, S.J., Noller, K.L., O'Brien, P., Kaufman, R.H., Townsend, D., Barnes, A.B., Gunderson, J., Lawrence, W.D., Bergstrahl, E., McGorray, S., Tilley, B.C., Anton, S., & Chazen, G. (1984). Increased incidence of cervical and vaginal dysplasia in 3980 diethylstilbestrol-exposed young women. *Journal of the American Medical Association*, 252, 2979-2983.

- Shafer, M., Irwin, C.E., Adler, N.E., & Crittenden, M.R. (1984). Self-concept in the diethylstilbestrol daughter. *Obstetrics & Gynecology*, *63*, 815-819.
- Spence, J.T. (1993). Gender-related traits and gender ideology: Evidence for a multifactorial theory. *Journal of Personality and Social Psychology*, *64*, 624-635.
- Stillman, R.J. (1982). In utero exposure to diethylstilbestrol: Adverse effects on the reproductive tract and reproductive performance in male and female offspring. *American Journal of Obstetrics and Gynecology*, *142*, 905-921.
- Taylor, S.E. (1995). *Health Psychology*. New York: McGraw-Hill.
- Van Heck, G.L., Vingerhoets, A.J.J.M., Bekker, M.H.J., & Rompa, C. (in preparation). Coping styles as predictors of well-being in women prenatally exposed to diethylbestrol (DES).
- Vessey, M.P., Fairweather, D.V.I., Norman-Smith, B., & Buckley, J. (1983). A randomized double-blind trial of the value of stilboestrol therapy in pregnancy: Long-term follow-up of mothers and their offspring. *British Journal of Obstetrics and Gynecology*, *90*, 1007-1017.
- Wingard, D.L., & Turiel, J. (1988). Long-term effects of exposure to diethylstilbestrol. *Western Journal of Medicine*, *149*, 551-554.
- Yalom, I.D., Green, R., & Fisk, N. (1973). Prenatal exposure to female hormones. Effect on psychosexual development in boys. *Archives of General Psychiatry*, *28*, 554-561.
- Zalmstra, H.A.M., 't Hoen, E.F.M., & Visser, A. Ph. (1986). DES-actiegroep: Invloed op kennis, beleving en arts-patiëntrelatie van DES-dochters [DES action group: Influence upon knowledge, experience and the doctor-patient relationship of DES-daughters], *Medisch Contact*, *44*, 1415-1418.