Personality functioning: the influence of stature

F Ulph, P Betts, J Mulligan, R J Stratford

Background: The Wessex Growth Study has monitored the psychological development of a large cohort of short normal and average height control participants since school entry.

Aims: To examine the effect of stature on their personality functioning now that they are aged 18–20 years.

Methods: This report contains data from 48 short normal and 66 control participants. Mean height SD score at recruitment was: short normals −2.62 SD, controls −0.22 SD. Final height SD score was: short normals −1.86, controls 0.07. The Adolescent to Adult Personality Functioning Assessment (ADAPFA) measures functioning in six domains: education and employment, love relationships, friendships, coping, social contacts, and negotiations.

Results: No significant effect of recruitment height or final height was found on total ADAPFA score or on any of the domain scores. Socioeconomic status significantly affected total score, employment and education, and coping domain scores. Gender had a significant effect on total score, love relationships, coping, and social contacts domain scores. Salient aspects of daily living for this sample were identified from the interviews (prevalence%): consuming alcohol (94%), further education (63%), love relationships (55%), current drug use (29%), experience of violence (28%), parenthood (11%), and unemployment (9%). Stature was not significantly related to behaviour in any of these areas.

Conclusions: Despite previously reported links between short stature and poorer psychosocial adaptation, no evidence was found that stature per se significantly affected the functioning of the participants in these areas as young adults.

METHODS

The participants in the Wessex Growth Study were initially recruited at school entry and have had height and weight measurements taken regularly since. Two previous reports have been made on psychological functioning at age 7–9 years\(^\text{16}\) and 11–13 years\(^\text{14}\). This paper reports on assessments made when they were 18–20 years of age.

The participants were interviewed using a standard interview schedule—the Adolescent to Adult Personality Functioning Assessment (ADAPFA)—which measures social and interpersonal role performance in six domains: education and employment, love relationships, friendships, coping, social contacts, and negotiations.\(^\text{15}\) These are all developmental areas in which it has been shown in the literature that people with short stature may have difficulties. The domains are scored using an age related framework resulting in six domain scores between 0 and 5 with higher scores indicating poorer functioning. The domain scores can be aggregated to form a composite ADAPFA score, with a maximum of 30 and a cut off score of 16 above which functioning is regarded as dysfunctional.\(^\text{20}\) The ADAPFA is a development from the Adolescent to Adult Personality Functioning Assessment (APFA) which in research with adults has shown reliability and construct validity. ADAPFA, adapted to focus on the adolescent to adult transition, has been used in a recent follow up of interpersonal and social role performance in young people who experienced cancer in childhood, a study comparable in scope to the present one.

ADAPFA scoring, which provides information on the level of functioning within its six domains, is based on material...
from interviews lasting approximately an hour. Transcripts of interviews carried out in this study were further utilised to afford a more qualitative analysis of the participants’ life experience as emerging adults. This thematic analysis identified a set of discrete “marker” behaviours within each ADAPFA domain, which have been labelled collectively as “aspects of daily living” (see table 1). These relate to education received beyond school, employment status, relationships with a partner, parenthood, drug taking, drinking, and involvement with violence. Simple counts were made of the numbers of participants in each group who confirmed the behaviour during their interview.

Participants
At the beginning of this phase of the research 61% of the original participants were still available to the study (76 short normal (SN) and 94 control (C)). This reduction in sample size was due to attrition and an earlier recruitment of some of the participants into a separate study investigating the psychological effects of GH treatment. This treatment was offered to the very shortest of the total sample (less than –2 SD score for height), but allocation was random—by lot—leaving no systematic effect on the representativeness of the remainder. Of these remaining 170 participants, 114 (48 SN, 66 C) were interviewed (67%). Assessments were made to examine whether these 114 participants were representative of the available sample for interview (see table 2).

At initial recruitment, two distinct groups were selected: short normal participants, with height below the 2nd centile according to the 1990 UK Growth Standards and age and gender matched average height controls. During the course of the Wessex Growth Study there has been variation in participants’ height SD scores in both the short and average height control groups in some cases to such a degree that there is considerable overlap of the two groups’ final height SD scores (fig 1). The ADAPFA scores and the aspects of daily living results were therefore analysed to examine the effect of both recruitment and final height.

Analyses
To control for the potential effects of both gender and socioeconomic status (SES) on personality functioning, group mean differences in the total and six domain ADAPFA scores between height groups were examined using multivariate analysis of covariance (MANCOVA). In this way, differences between the height groups associated with gender (with males typically taller), and with SES (with the more affluent groups typically taller) would be controlled for these two critical independent variables. Gender was established on entry to the study and SES information had previously been supplied by parents. The data in the coping domain when adult height groups were separated reached significance (p = 0.005) on Levene’s test of homogeneity, indicating

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Derivation of aspects of daily living</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADAPFA domain</td>
<td>Aspect of daily living</td>
</tr>
<tr>
<td>Background questions</td>
<td>Drug taking behaviours</td>
</tr>
<tr>
<td></td>
<td>Drinking frequency</td>
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<tr>
<td>Education and employment</td>
<td>Further education</td>
</tr>
<tr>
<td></td>
<td>Employment</td>
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<tr>
<td>Love relationships</td>
<td>Relationships</td>
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<tr>
<td></td>
<td>Parenthood</td>
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<tr>
<td>Sexual contacts</td>
<td>Experience of violence</td>
</tr>
</tbody>
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<thead>
<tr>
<th>Table 2</th>
<th>comparison of interviewed participants with the remaining Wessex Growth Study sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short normal participants</td>
<td>Control participants</td>
</tr>
<tr>
<td>Interviewed</td>
<td>Not interviewed</td>
</tr>
<tr>
<td>Recruitment height</td>
<td>–2.62</td>
</tr>
<tr>
<td>Final height</td>
<td>–1.86</td>
</tr>
<tr>
<td>SES (%)</td>
<td>0.078</td>
</tr>
<tr>
<td>Non-manual</td>
<td>18 (38)</td>
</tr>
<tr>
<td>Manual</td>
<td>27 (54)</td>
</tr>
<tr>
<td>Benefit</td>
<td>3 (6)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>22 (46)</td>
</tr>
<tr>
<td>Male</td>
<td>26 (54)</td>
</tr>
</tbody>
</table>
that the data should not be analysed parametrically. A
Kruskal-Wallis H test was used to analyse this data, and this
comparison alone was not adjusted for gender and SES.
Analyses of variance and \( \chi^2 \) tests were used to explore
the possible mechanisms for significant class and gender effects
on the ADAPFA domains. Patterns of behaviour in the aspects of daily living categories were compared using the \( \chi^2 \)
test.

**RESULTS**

**ADAPFA**

**Effect of recruitment height**

Table 3 shows the means and standard deviations of the short
normal and control group participants’ scores on total and six
domains of ADAPFA. After adjusting for gender and SES,
there was no significant difference between the groups
selected on recruitment height on the ADAPFA derived scores
\( F = 1.281, \text{df} = 7, 104, p = 0.267 \). Thus recruitment height
did not appear to be affecting how the participants
functioned in adult roles in society. There were no significant
univariate differences between the height groups after the
adjustment. ADAPFA total scores, and three of the domain
scores produced higher scores for short normal than average
height participants, but these differences were slight, and
none were significant when compared individually.

As expected, however, the covariates of gender and
socioeconomic status both contributed to performance on
the ADAPFA. Gender had a significant effect on the total
ADAPFA score \( (F = 7.041, p = 0.009) \) and also on the love
relationships \( (F = 4.13, p = 0.045) \), social contact \( (F = 4.115, p = 0.045) \),
and coping domain scores. In each instance, males scored
higher than females, indicating poorer functioning.
It was thought that the relation between gender and
social contact domain scores may be influenced by involve-
mement in violence, as such behaviour would result in higher
scoring and males more frequently reported being involved in
violence (males 37%, females 17%, \( p = 0.064 \)). The relation
between involvement in violence and problems in the social
contacts domain also approached significance \( (p = 0.061) \).

Socioeconomic status had a significant effect on total
ADAPFA score \( (F = 14.304, p = 0.006) \) and also on the domains
of education and employment \( (F = 11.199, p = 0.001) \), and coping.
In each of these areas low socioeconomic status was associated with poorer functioning. The
IQ of all participants had been obtained previously\(^{16}\) and since IQ is associated with social class and educational
outcome, we examined the influence of IQ on the education
and employment domain but found no significant effect
\( (p = 0.13) \).

There were no significant interaction effects between
height, class, and gender.

A similar number of short normal and control participants
had a total ADAPFA score of 16 or above, which is taken as
indicating some degree of personality dysfunction \( (SN: 10
(21\%), C: 11 (17\%), p = 0.371) \).

**Effect of adult stature**

Table 4 shows the means and standard deviations of the three
adult height group participants’ scores on total and five of the
six domains of ADAPFA. The MANCOVA results found no
effect of adult height on personality functioning after
adjusting for SES and gender \( (F = 0.884, \text{df} 14, 206, p = 0.518) \).
Coping domain scores were not distributed appropriately
for parametric analysis, but the Kruskal-
Wallis score obtained for an unadjusted comparison was
not significant either. There were no significant univariate
differences between the height groups after the adjustment.
Again, though, the mean total ADAPFA score was higher for
the shortest adult height group, and domain scores for
Friendship and Negotiation were also close to a significant
difference when compared individually across the three
height groups. The patterns of significant effects of gender and SES were
however the same as those found when comparing the
recruitment height groups. Gender had a significant effect on
total ADAPFA score \( (F = 7.7, p = 0.006) \), love relationships
\( (F = 3.861, p = 0.052) \), social contacts \( (F = 4.739, p = 0.039) \),
and coping \( (p = 0.004) \). SES had a significant effect on total
ADAPFA score \( (F = 14.304, p < 0.001) \) and the education
and employment domain score \( (F = 11.199, p = 0.001) \). Again the
percentages of participants with ADAPFA scores above the
suggested cut off point of 16 for psychological dysfunction
were similar across the groups \( (< 2 \text{SD}: 4 (21\%), 2 \text{to} 0 \text{SD}: 11
(18\%), > 0 \text{SD}: 6 (18\%), p = 0.948) \).

**Aspects of daily living**

No significant effects of either recruitment height or adult
height were found on the aspects of daily living (tables 5 and
6).

**DISCUSSION**

In this study, childhood stature and final adult stature have
different implications for the personality functioning of
young adults. Though the shortest group has received slightly
higher scores in some domains, the young people across the
height groups interviewed have generally described similar
patterns of behaviour. These results are in line with previous
results from the Wessex Growth Study that short normal

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**Table 3** Mean total and domain scores on ADAPFA for short normal and control groups, determined by childhood height, before adjustment for gender and social class

<table>
<thead>
<tr>
<th>Childhood height</th>
<th>SN (n = 48)</th>
<th>C (n = 66)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADAPFA total score</td>
<td>12.12 (4.44)</td>
<td>11.35 (4.07)</td>
</tr>
<tr>
<td>Education and employment</td>
<td>1.90 (1.12)</td>
<td>1.89 (1.20)</td>
</tr>
<tr>
<td>Love relationships</td>
<td>2.65 (1.60)</td>
<td>2.3 (1.40)</td>
</tr>
<tr>
<td>Friendships</td>
<td>2.17 (1.21)</td>
<td>1.80 (1.13)</td>
</tr>
<tr>
<td>Social contacts</td>
<td>2.04 (1.17)</td>
<td>2.03 (1.18)</td>
</tr>
<tr>
<td>Coping</td>
<td>1.79 (0.85)</td>
<td>1.97 (0.86)</td>
</tr>
<tr>
<td>Negotiations</td>
<td>1.77 (1.22)</td>
<td>1.47 (1.08)</td>
</tr>
</tbody>
</table>

**Table 4** Mean (SD) total and domain ADAPFA scores for the three groups based on adult height, before adjustment for gender and social class

<table>
<thead>
<tr>
<th>Adult height</th>
<th>&lt; –2 SD</th>
<th>–2 SD to 0 SD</th>
<th>&gt; 0 SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>(n = 19)</td>
<td>(n = 61)</td>
<td>(n = 34)</td>
<td></td>
</tr>
<tr>
<td>ADAPFA total score</td>
<td>13.05 (4.08)</td>
<td>11.59 (4.13)</td>
<td>10.64 (4.42)</td>
</tr>
<tr>
<td>Education and employment</td>
<td>1.95 (1.08)</td>
<td>2.00 (1.18)</td>
<td>1.68 (0.98)</td>
</tr>
<tr>
<td>Love relationships</td>
<td>2.63 (1.74)</td>
<td>2.36 (1.18)</td>
<td>2.50 (1.40)</td>
</tr>
<tr>
<td>Social contacts</td>
<td>2.32 (1.20)</td>
<td>2.00 (0.90)</td>
<td>1.59 (1.05)</td>
</tr>
<tr>
<td>Coping</td>
<td>1.79 (0.54)</td>
<td>1.89 (0.90)</td>
<td>1.97 (0.94)</td>
</tr>
<tr>
<td>Negotiations</td>
<td>2.16 (1.30)</td>
<td>1.52 (1.06)</td>
<td>1.41 (1.16)</td>
</tr>
</tbody>
</table>

*This comparison based on a Kruskal-Wallis analysis only, with no adjustment for gender and SES.
before referral to a growth clinic, suggesting perhaps that a
In some cases psychological concerns might already exist
related concerns (usually on behalf of others: their children).

"aspects of daily living", based on height at initial
recruitment

<table>
<thead>
<tr>
<th>Aspects of daily living</th>
<th>SN %</th>
<th>Control %</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current drug use</td>
<td>23</td>
<td>32</td>
<td>0.36</td>
</tr>
<tr>
<td>Drug frequency</td>
<td>10</td>
<td>21</td>
<td>0.64</td>
</tr>
<tr>
<td>Drinking frequency</td>
<td>54</td>
<td>73</td>
<td>0.21</td>
</tr>
<tr>
<td>Further education</td>
<td>67</td>
<td>63</td>
<td>0.76</td>
</tr>
<tr>
<td>Employment</td>
<td>52</td>
<td>67</td>
<td>0.16</td>
</tr>
<tr>
<td>Relationships</td>
<td>52</td>
<td>55</td>
<td>0.33</td>
</tr>
<tr>
<td>Parenthood</td>
<td>10</td>
<td>10</td>
<td>0.68</td>
</tr>
<tr>
<td>Violence severity</td>
<td>4</td>
<td>15</td>
<td>0.16</td>
</tr>
<tr>
<td>Victim</td>
<td>8</td>
<td>8</td>
<td>0.34</td>
</tr>
</tbody>
</table>

stature has not had a significant adverse effect on functioning
during childhood and early adolescence. 16–18

It has been suggested in the literature that adults of short
stature might function differently in the areas of education,
employment, love relationships, and friendships, 19–22 but no
significant differences in these areas were found. The Wessex
Growth Study is the first longitudinal study of the effects of
stature in a community sample and thus may show a truer
picture of the effects of stature on daily living than previous
reports which have predominantly been cross sectional, or
based on mixed diagnostic group or clinic referred samples.

The participants were identified solely on the basis of their
height at school entry and none had been referred to a
growth clinic, or had any concern expressed about them.
Crucially also their age at recruitment reflected the time
when treatment decisions (relating to short stature) are being
made. The outcomes described in this paper therefore imply
that an increase in height per se for these participants would
not necessarily have contributed any more to their quality of
life. Clearly there may still be referrals to growth clinics, but
perhaps such clinics could review psychotherapeutic alternat-
es to medical treatment for those who do express height
related concerns (usually on behalf of others: their children).
In some cases psychological concerns might already exist
before referral to a growth clinic, suggesting perhaps that a
form of psychological screening might be relevant, though
this is not a direct indication from the study.

The data from this study do, however, confirm that
personality functioning is influenced by both gender and
SES. The relation between personality and gender is not
surprising. Costa et al have shown the cultural stability of
male and female personality traits, 23 and previous studies
using the parent measure of the ADAPFA, the ADPFA, have
reported gender effects. 24 The females in our study were more
likely than males to be functioning independently and to be
in a love relationship and less likely to have problems in the

Table 6 Comparisons of the percentage of short average and above average height
young people reporting behaviours labelled as ‘aspects of daily living’, based on final
adult height

<table>
<thead>
<tr>
<th>Aspects of daily living</th>
<th>Short %</th>
<th>Average %</th>
<th>Above average %</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current drug use</td>
<td>16</td>
<td>31</td>
<td>30</td>
<td>0.70</td>
</tr>
<tr>
<td>Drug frequency</td>
<td>0</td>
<td>22</td>
<td>15</td>
<td>0.67</td>
</tr>
<tr>
<td>Drinking frequency</td>
<td>42</td>
<td>67</td>
<td>72</td>
<td>0.27</td>
</tr>
<tr>
<td>Further education</td>
<td>63</td>
<td>62</td>
<td>70</td>
<td>0.93</td>
</tr>
<tr>
<td>Employment</td>
<td>47</td>
<td>61</td>
<td>67</td>
<td>0.26</td>
</tr>
<tr>
<td>Relationships</td>
<td>42</td>
<td>61</td>
<td>45</td>
<td>0.29</td>
</tr>
<tr>
<td>Parenthood</td>
<td>10</td>
<td>12</td>
<td>6</td>
<td>0.77</td>
</tr>
<tr>
<td>Violence severity</td>
<td>5</td>
<td>12</td>
<td>9</td>
<td>0.72</td>
</tr>
<tr>
<td>Victim</td>
<td>5</td>
<td>12</td>
<td>3</td>
<td>0.33</td>
</tr>
</tbody>
</table>

social contacts domain. There are several explanations for
these findings. First, even in European cultures such as ours,
social role functioning is consistent with gender stereotypes
with women still performing the majority of household
tasks. 25 It is possible that gender differences in the coping
domain were attributable simply to the females’ greater
involvement in this area as much of the rating in this domain
rests on the participants’ ability to feed and clothe themselves
and manage their finances. Second, the participants were
assessed when they were 18–20 years old, the youngest age
group for which the ADAPFA is recommended. It is possible
that, in the domain of love relationships, a gender bias is
inherent when used with such a group. Further studies
including 18–20 year olds are needed to substantiate this
hypothesis. Third, the domain of social contacts is influenced
by involvement in violence. Reports of violent acts increase
scores and in our study, males, short and control, tended to
report involvement in acts of violence more often than the
females.

The young adults in our study who were from a lower SES
were more likely to experience problems in education,
employment, and day to day living tasks such as managing
finances. Others have also found that SES affects both
personality functioning 26 and education. 27 IQ did not explain
the relation between SES and the education and employment
domain scores, possibly because participants with lower IQs
were performing adequately in the employment domain. The
finding that SES but not IQ was associated with scoring on
the education and employment domain suggests that
participants with lower SES were less likely to achieve their
potential in these areas. Indeed research shows that lower
childhood SES can have negative effects on later adult life. 28

The results of this study seem to reflect untroubled
development for short normal participants. However, it is of
concern to note that a significant number of young adults,
both short and control, reported involvement in high risk
taking behaviour such as drug use and severe violence
(table 5), and that 10 SN and 11 C participants showed some
degree of personality dysfunction. Neither childhood nor
adult short stature appears to be a contributory factor. While
neither recruitment or adult height can be seen as a
contributory factor, further analysis of the specific determi-
nants here will be reported separately. Similarly the interac-
tion of pubertal timing with these life experiences is also of
interest, perhaps particularly in a study of growth, and again
possible relations here are being examined.

Some limitations to the findings of the present study are
evident. Firstly, as described in the methods section of the
170 participants who remained available for this phase of the
study, only 114 participants could be interviewed. These
participants were however found to be representative of the
total sample available for this phase of the research.
Secondly, the height SD of a proportion of the short normal participants is now above the original centile band defining short stature. Such a phenomenon has been reported in other studies. Few, however, had a height above the 25th centile and our results are from a sample of young adults who for the majority of their lives have been shorter than their peers, having been recruited at the critical age for treatment decisions.

In summary, no significant differences in personality functioning or aspects of daily living were found which could be attributable to height. This should not be interpreted as indicating that people with short stature will not experience problems in their development, but that they are no more likely to do so than those who are taller. This study is unique as it reports on the effect of both childhood height on adult functioning and the effect of adult height on functioning in the same sample.

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REFERENCES

ARCHIVIST

Steroids for Kawasaki disease

Standard initial treatment for Kawasaki disease in the USA is a single dose of intravenous immunoglobulin (IVIG) 2 gm/kg plus aspirin 80–100 mg/kg/day. The role of steroid treatment is controversial. Steroids have been used either as initial therapy or as rescue therapy after failure of IVIG and aspirin. Most studies have documented clinical improvement with steroids but there has been a suggestion that the risk of coronary abnormalities might be increased. A small trial in Boston, Massachusetts of pulsed-dose intravenous methylprednisolone added to IVIG and aspirin as initial treatment has confirmed that clinical resolution is quicker with steroid therapy (Robert P Sundel and colleagues. Journal of Pediatrics 2003;142:611–6, see also editorial, ibid 601–3).

Thirty-nine children were randomised on day 4–10 (median, day 7) of illness to IVIG 2 gm/kg over 10 hours plus oral aspirin either with or without pulsed-dose intravenous methylprednisolone, 30 mg/kg prior to the IVIG. The methylprednisolone group had a shorter duration of fever after starting treatment (1.0 vs 1.9 days), shorter hospital stay (1.9 vs 3.3 days), and lower ESR and C-reactive protein at 6 weeks. Coronary artery dimensions after treatment did not differ significantly between the two groups but numbers were small. The authors of this paper call for a large, multicentre trial. An editorialist advises that in the meantime there is not enough evidence to justify the routine use of steroids in primary therapy. For rescue therapy he also considers the evidence to be inadequate but prefers to use a second, or even a third, dose of IVIG if necessary.