Many companies, realising that well-presented financial information can promote their image, are including graphs in their annual reports (Johnson, Rice and Roemmich 1980). Graphics can "emphasise relationships, focus interest, save time in analysing data, help recall, uncover previously hidden facts and break down the language barrier" (Holmes 1984, p. 65). They can also highlight trends and aid in the presentation of summary information (Johnson, Rice and Roemmich, p. 50). Many users of financial reports do not have the time, inclination or ability to read, let alone analyse, the entire annual report, so graphs can efficiently highlight salient points (Leach 1988, p. 93).

Descriptive studies on the use of graphs in annual reports of listed companies exist in the US (for example, Steinbart 1989) and the UK (Beattie and Jones 1992), but none has been made in Australia. This paper is intended to provide systematic, descriptive evidence on the use of graphs in the annual reports of Australian entities.

Statement of Accounting Concepts SAC 2 Objective of General Purpose Financial Reporting specifies that the objective of general-purpose financial reporting is to "provide information useful to users for making and evaluating decisions about the allocation of scarce resources" (paragraph 43). Financial reporting "is not an end in itself, but is a means of communicating relevant and reliable information" (para. 11). Statement of Accounting Concepts SAC 3 Qualitative Characteristics of Financial Information specifies that financial information should (inter alia) be representationally faithful and unbiased. SAC 3 also requires the preparers of general-purpose financial reports to "present information in the most understandable manner without sacrificing relevance or reliability" (para. 37). This could be seen as an endorsement of the presentation of graphs in general-purpose financial reports (Sias 1970). While graphs presented in annual reports may not be within the scope of general-purpose financial reporting, they Effective communication of information using graphs depends on the graphs being constructed so that they faithfully represent the underlying data. If certain principles of graphic construction are violated, graphs will be distorted and may mislead users of financial statements. The paper develops and tests hypotheses concerning the relationship between the use and construction of graphs in the annual reports of companies and the performance of those companies.
should be representationally faithful and unbiased if they are to provide useful information to users of financial statements.

Another purpose of this paper is to investigate the extent of selectivity in the use of graphs and distortion in the presentation of graphs in annual reports and whether these are related to firm performance.

Statement of Auditing Practice AUP 19 Other Information in Documents Containing Audited Financial Statements provides further motivation for examining graphs in company annual reports. This statement requires the auditor to read other information (such as reports by management, financial highlights and financial ratios) included with the financial statements to determine that it is "not materially inconsistent with the financial statements" (para. 7). AUP 19 goes on to say that other information, "or the manner of its presentation, is materially inconsistent when it contradicts information contained in the financial statements" (para 8). This means that the content and presentation of graphs have to be considered by auditors. However, there is no authoritative guidance as to the level of distortion in graph construction which is necessary for a material inconsistency to arise. This paper provides some empirical evidence about the extent of possible material inconsistencies in graph presentation by Australian companies and attempts to establish whether such material inconsistencies are related to company performance.

GRAPHIC CONSTRUCTION AND PRESENTATION

Graphs are potentially important in communicating information to users of annual reports only if they are "fairly" presented. One exposition of this requirement is that of Tufte (1983), who states (p. 57) that "graphic integrity and hence fair presentation of data in graphs would follow if six principles were employed. Tufte's first principle (p. 77) is: "The representation of numbers, as physically measured on the surface of the graphic itself, should be directly proportional to the numeric quantities represented." Tufte operationalised this principle (p. 57) with a measure called the "lie factor":

$$\text{lie factor} = \frac{\text{size of effect shown in graphic}}{\text{size of effect in numeric data}}$$

A lie factor of 1 indicates that Tufte's first principle has been adhered to. Tufte states that lie factors greater than 1.05 and less than .95 indicate "substantial distortion" (p. 57).

This formula was amended slightly in an accounting setting by Taylor and Anderson (1986, p. 135) and Steinbart (p. 61) to produce the graph discrepancy index (GDI) which is calculated as follows:

$$\text{graph discrepancy index} = 100 \times \frac{(a/b) - 1}{b}$$

where

- $a$ = percentage change depicted in graph
- $b$ = percentage change in data

The graph discrepancy index is employed in this study. A GDI of 0% indicates that graph has been properly constructed; GDI values greater than 5% and less than -5% indicate that the graph is distorted. Factors which may cause the GDI to deviate from 0 include non-zero vertical axis (Sugden 1989, p. 101), non-arithmetic scales (Johnson, Rice and Roemmich) and incorrectly scaled vertical axis where the distance shown on the graph is not proportional to the numbers (Leach, p. 93).

**PRIOR EMPIRICAL ACCOUNTING RESEARCH**

Johnson, Rice and Roemmich examined 50 annual reports (including 423 graphs) over the period 1977-78 for US companies selected randomly from the Fortune 500 list. Their findings showed that at least one incorrectly constructed graph was found in 42% of the annual reports, and 29.5% of all the graphs reviewed were constructed incorrectly. The study did not address the issues of selectivity in the use of graphs and measures of the extent of distortion resulting from incorrect graph construction.

Steinbart studied the annual reports of 319 companies from the Fortune 500 to determine whether the magnitude of change portrayed in graphs matched the numerical magnitude of change presented in the financial data. This alignment involves Tufte's first principle and was measured using the graph discrepancy index described earlier. The GDI was applied to graphs of key financial variables which were defined as sales, profits and dividends. These were chosen because of their importance to users and their reliance on financial statement data. Steinbart found that "on average, graphs of the three variables exaggerated the magnitude of change by about 11%" (p. 63). An absolute distortion of more than 10% was found in about 26% of the graphs of key financial variables in the sample.

Steinbart divided his sample into "good news companies" (increase in net profit for the relevant year) and "bad news companies" (decrease in net profit) and found selectivity in the use of graphs. Good news companies were more likely (74% against 53%) to include graphs of key financial variables in the annual report. He also found that bad news companies were more likely to include distorted graphs. These differences were significant at the 1% and 5% level, respectively.

Beattie and Jones studied the "use and abuse" of graphs in the 1989 annual reports of 240 UK listed companies and identified four hypotheses. The first two were concerned with selectivity in the use of graphs. They hypothesised that graphs of key financial variables (defined to include EPS as well as sales,
profits and dividends) were more likely to be presented in annual reports of companies which were performing well. Company performance was measured by (a) the change in EPS and (b) the change in the key financial variable graphed. The results supported these hypotheses.

The second two hypotheses were concerned with distortion in the construction of graphs. Favourable distortion was considered more likely than unfavourable, with poorly performing companies more likely to engage in favourable distortion than companies which were performing well. Beattie and Jones found that 76% of the graphs that were material distorted provided a favourable portrayal (that is, exaggerated an upwards trend or understated a downward trend), with 24% unfavourable. This difference was found to be significant at the 1% level.

Beattie and Jones concluded (p. 301) that:
- graphs are widely used;
- companies with "good" performance are significantly more likely to use graphs;
- measurement distortion is significant; and
- the effect of measurement distortion is generally to portray the company's performance more favourably.

**HYPOTHESIS DEVELOPMENT**

Unlike the previous overseas studies, data for this study were gathered from a sample of both listed companies and not-for-profit entities. The following null hypotheses are stated:

**H1: Selectivity**

*There is no association between the presence of graphs of key financial variables in the annual reports of companies and the performance of those companies.*

Selectivity is concerned with whether the company's decision to include graphs and the choice of variables graphed is systematically related to the entity's performance. If H1 is rejected, this indicates bias on the part of some entities in the inclusion of graphical data in their annual reports. This information may not be reliable and therefore not decision-useful.

Consistent with earlier studies, this hypothesis is confined to examining selectivity in the presentation of graphs of key financial variables. These are defined as sales, profit, earnings per share (EPS) and dividends. Selectivity is tested cumulatively (that is, whether graphs of any of the four variables are present in the company's annual report) and individually (that is, whether graphs of each of the key financial variables are present).

H1 relates selectivity to company performance. Company performance is classed as either good or bad. Two separate partitions for classifying performance are used — the year-to-year change in operating profit before tax, and the year-to-year change in the variable being graphed.

The results for H1 are analysed in total and, unlike previous studies, separately for large companies (top 50 by market capitalisation) and small companies (next 100). This approach is preferred because the Australian sharemarket is comparatively small and thinly traded, compared with the US and UK markets. Companies outside the top 50 are considered to attract less attention from analysts, institutional investors and the public.

Consistent with the US and UK studies, H1 is tested using the chi-square test.

**H2: Distortion**

*There is no association between the impact of graphical distortion (favourable/unfavourable), in the graphs of key financial variables presented in the annual reports of companies and the performance of those companies (good/bad).*

Distortion is concerned with the extent to which the graphs of key financial variables faithfully represent the underlying data. If H2 is rejected, it indicates that some graphs presented in annual reports are distorted in a fashion which is systematically related to the company's performance.

In operationalising H2, the GDI was used to measure distortion. Values of GDI above +5% are classed as exaggeration and values below -5% are classed as understatement. This follows Tufte and is consistent with Beattie and Jones. Steinbart used a 10% cut-off and, to allow comparison, our results were also calculated using this figure.

The effect of graphical distortion is classed as favourable if an improving performance is exaggerated or if a declining performance is understated. The effect is classed as unfavourable in the opposite circumstances. The classification of a company's performance is initially based on the year-to-year change in the company's operating profit before tax.

Results using other bases to classify performance are reported later in this paper.

H2 is tested as follows. All cases of graph distortion are considered and, consistent with the UK study, the binomial test is used to determine whether favourable distortion and unfavourable distortion are equally likely. As for H1, the results are tested in total and separately for the top 50 and next 100 companies.

H2 is also relevant to investigating material inconsistency between graphs and the underlying financial data. By adapting measures suggested in previous research, attempts were made to establish the extent of possible material inconsistency between graphs of key financial variables and the underlying data. The relationship between instances of material inconsistency and company performance (measured as the change in the variable graphed) is also identified.
SAMPLE AND DESCRIPTIVE RESULTS

The sample consists of two groups. The first is the top 150 Australian Stock Exchange listed companies by market capitalisation as at December 1992. Seven companies were eliminated from the sample because their 1992 and/or 1991 annual report(s) could not be obtained. The 1991 and 1992 annual reports of each of the remaining 143 companies were obtained. The second group in the sample is 44 not-for-profit entities including government departments, statutory authorities, hospitals and private-sector not-for-profit organisations such as charities and sporting clubs throughout Australia. Each not-for-profit entity's 1991 annual report was obtained.

Table 1 reports the frequency with which graphs were included in the annual reports of Australian entities.

Eighty per cent of entities in the sample included graphs of some variables in their annual reports. Graph usage was greater among listed companies (83%) than among not-for-profit entities (73%). The 83% figure for listed companies can be compared with 79% for US companies surveyed (Steinbart, p. 63) and 79% for UK companies surveyed (Beattie and Jones, p. 295). Australian companies make slightly greater use of graphs overall; however, graphs of key financial variables (66% of Australian companies surveyed) are found with similar frequency to the US (67%) and the UK (65%). While turnover and profit were graphed in Australia with approximately the same frequency as in the UK, earnings per share and dividends were graphed with lower frequency. As expected, not-for-profit entities had very few graphs of key financial variables other than turnover.

RESULTS FOR H1: SELECTIVITY

Selectivity is concerned with whether the inclusion of graphs and the choice of variables graphed is related to the company's performance. The relationship between the presence of graphs of key financial variables and measures of company performance (change in operating profit before tax and change in the variable being graphed) was tested on the entire sample of listed companies using a chi-square test. There was some indication of selectivity. For example, 71% of companies whose profit increased included at least one graph of key financial variables in their annual reports, whereas only 62% of companies whose profit decreased included such graphs. However, none of the test results was statistically significant and they are not reported.

These findings contrast sharply with those of Steinbart and of Beattie and Jones. Steinbart found selectivity in the use of graphs in that a significantly greater percentage of companies whose profit increased (74%) used graphs of key financial variables in their annual reports, compared with companies whose profit decreased (53%, result significant at the 1% level). Beattie and Jones reported a similar relationship, significant at the 1% level in 14 of 18 chi-square tests.

To analyse this issue further, results were considered for the top 50 and next 100 companies separately. The results of these tests are shown in Table 2.

The results in Panel A of Table 2 for the top 50 companies again show no significant relationship between performance and the inclusion of graphs of key financial variables. This is so whether performance is measured as the change in operating profit before tax or the change in the variable being graphed.

However, when the next 100 companies are considered, graphs of key financial variables are significantly more likely to be included in the annual reports of smaller companies when the performance of the company has improved. Panel B of Table 2 shows that five of the nine tests are significant at the 10% level or better, an outcome which is unlikely to be the result of chance factors. This result does not seem to be sensitive to the way in which performance

<table>
<thead>
<tr>
<th>Variable graphed</th>
<th>Not-for-profit entities n = 44</th>
<th>Listed companies n = 143</th>
<th>Total sample n = 187</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any financial or non-financial variable</td>
<td>32 73</td>
<td>118 83</td>
<td>150 80</td>
</tr>
<tr>
<td>At least one key financial variable</td>
<td>19 43</td>
<td>94 66</td>
<td>113 60</td>
</tr>
<tr>
<td>Turnover</td>
<td>19 43</td>
<td>59 41</td>
<td>78 42</td>
</tr>
<tr>
<td>Profit</td>
<td>3 7</td>
<td>75 52</td>
<td>78 42</td>
</tr>
<tr>
<td>Earnings per share</td>
<td>0 0</td>
<td>39 27</td>
<td>39 21</td>
</tr>
<tr>
<td>Dividends</td>
<td>0 0</td>
<td>48 34</td>
<td>48 26</td>
</tr>
</tbody>
</table>
TABLE 2: SELECTIVITY

Relationship between inclusion of graphs of key financial variables, company performance and company size

<table>
<thead>
<tr>
<th>Panel A: Top 50 companies</th>
<th>Any key financial variable graphed</th>
<th>Individual key financial variables graphed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Performance</td>
<td></td>
<td>Turnover</td>
</tr>
<tr>
<td>Change in profit</td>
<td>$x^2 = .201$</td>
<td>$x^2 = .309$</td>
</tr>
<tr>
<td>before tax in current year</td>
<td>$n = 47$</td>
<td>$n = 47$</td>
</tr>
<tr>
<td></td>
<td>(.654)</td>
<td>(.579)</td>
</tr>
<tr>
<td>Change in variable</td>
<td>$x^2 = .022$</td>
<td>$x^2 = .281$</td>
</tr>
<tr>
<td>being graphed in current year</td>
<td>$n = 48$</td>
<td>$n = 47$</td>
</tr>
<tr>
<td></td>
<td>(.883)</td>
<td>(.596)</td>
</tr>
<tr>
<td>Panel B: Next 100 companies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in profit</td>
<td>$x^2 = 4.104$</td>
<td>$x^2 = 2.882$</td>
</tr>
<tr>
<td>before tax in current year</td>
<td>$n = 90$</td>
<td>$n = 90$</td>
</tr>
<tr>
<td></td>
<td>(.043)</td>
<td>(.089)</td>
</tr>
<tr>
<td>Change in variable</td>
<td>$x^2 = .396$</td>
<td>$x^2 = 3.636$</td>
</tr>
<tr>
<td>being graphed in current year</td>
<td>$n = 90$</td>
<td>$n = 90$</td>
</tr>
<tr>
<td></td>
<td>(.529)</td>
<td>(.059)</td>
</tr>
</tbody>
</table>

Significance levels are shown in parenthesis ( ).

is measured. Thus the relationship observed in the US and UK between performance and inclusion of graphs of key financial variables is only observed in Australia for smaller, less visible companies.

The annual reports of all sample companies in 1991 and 1992 were compared to identify any changes between these two years in the choice of the key financial variables that are graphed. Changes could fall into one of two categories, that is, a key financial variable graphed this year but not last year, and vice versa.

These changes were then related to the company's performance as measured by the change in that key financial variable.

A chi-square test of this relationship is significant at the 10% level ($X^2 = 3.795$). An analysis of these results for the top 50 companies and for the next 100 companies shows no association for the top 50 companies, but a positive and significant relationship ($X^2 = 4.202$, significant at 5% level) for the next 100 companies. Thus it appears that changes over time in graphs of key financial variables are not independent of company performance. Rather, for companies outside the top 50, graphs are more likely to be included when the performance of that variable has improved compared with the previous year and vice versa.

RESULTS OF H2: DISTORTION

Distortion is concerned with the extent to which the graphs of key financial variables faithfully represent the underlying data. Using the 5% cut-off to classify distortion as exaggeration or understatement, 29.7% of graphs of key financial variables presented in the annual reports of Australian listed companies are classed as distorted. Exaggeration (15.5%) occurs more frequently than understatement (14.2%). Graphs of earnings per share seem more prone to distortion (both exaggeration, 26%, and understatement, 38%) than do graphs of other key financial variables. These results can be compared to those of Beattie and Jones, which also found material distortion in 30% of graphs of key financial variables. However, they found exaggeration much more prevalent (22%) than understatement (8%).

Steinbart used a 10% cut-off on the GDI to identify exaggeration and understatement. Using a 10% cut-off, our study showed that 11.3% of graphs had a GDI of greater than +10 and 10.0% had a GDI of less than -10, a total of 21.3%. By comparison, Steinbart found 26% of graphs of key financial variables had a GDI of more than +10 or less than -10, with equal incidence of exaggeration and understatement. Thus, the incidence of distortion in graphs of key financial variables appearing in the annual reports of Australian listed companies appears similar to that
found for UK and US companies. The mean GDI scores are somewhat higher in this study, being +16.4% in this study, +10.7% in the UK (Beattie and Jones, p. 300) and +11.0% in the US (Steinbart, p. 66).

Distortion of graphs in the annual reports of the not-for-profit entities was also measured using the GDI. Selecting a maximum of three graphs from each not-for-profit entity which had graphed any financial or other variable, a sample of 90 graphs of both financial and non-financial variables was obtained. Using the 5% cut-off, it was found that 51% of graphs were distorted, with 32% exaggerated and 19% understated. The mean GDI score was +105.6%. This contrasts with the sample of graphs in listed companies where, using the same cut-off, 29.7% of the graphs of key financial variables were distorted and the mean GDI score was +16.4%.6 Differences in the regulatory environment between not-for-profit entities and listed companies and/or the skills of the preparers of graphs may explain these differences.

H2 is concerned with the relationship, if any, between the effect of distortion in the construction of graphs of key financial variables and the performance of the listed company. A binomial test was used to assess whether, among distorted graphs, favourable distortion (positive GDI with positive performance or negative GDI with negative performance) was significantly more likely than unfavourable distortion (vice versa). Using both the year-to-year change in operating profit before tax and the year-to-year change in the variable being graphed as measures of performance, the overall results were not significant. However, when performance was measured in terms of the change in the variable being graphed over the period represented on the graph (that is, the relationship between the first and last value recorded on the graph) a different picture emerges, as is shown in Table 3.

Panel A of Table 3 shows that, for the sample as a whole and where performance is considered over the period being graphed, distorted graphs of any of the key financial variables are significantly more likely to present performance favourably than unfavourably (1.4% level). This result is also found individually for graphs of turnover and, to a lesser extent, profit. Notwithstanding slight differences in the way performance was measured, these overall results are consistent with those of the US and UK studies.

However, when results are presented separately for the top 50 and the next 100 companies (Panels B and C), it can be seen that it is the next 100 companies which are driving the overall results. For these smaller companies, distorted graphs are significantly more likely to present the companies' performance favourably than unfavourably. This is true overall and for turnover and dividends (10% level or better, two-tailed). Because of the descriptive nature of this study, no explanation of this result was hypothesised.

The final issue for consideration is the extent to which graphs of key financial variables could be considered to be materially inconsistent with underlying financial data which, under AUP 19, may require action by the company's auditor. To investigate this issue it is necessary to operationalise the concept of

### TABLE 3: DISTORTION

Binomial tests of the relationship between graph distortion and company performance measured as the change in the variable over the period graphed

<table>
<thead>
<tr>
<th>Graphs of all key financial variables</th>
<th>Turnover</th>
<th>Profit</th>
<th>EPS</th>
<th>Dividends</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Panel A</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All companies</td>
<td>n = 129</td>
<td>n = 26</td>
<td>n = 52</td>
<td>n = 25</td>
</tr>
<tr>
<td></td>
<td>fav = 79</td>
<td>fav = 18</td>
<td>fav = 33</td>
<td>fav = 12</td>
</tr>
<tr>
<td></td>
<td>p = .014</td>
<td>p = .029</td>
<td>p = .072</td>
<td>p = 1.0</td>
</tr>
<tr>
<td><strong>Panel B</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top 50 companies</td>
<td>n = 54</td>
<td>n = 7</td>
<td>n = 19</td>
<td>n = 16</td>
</tr>
<tr>
<td></td>
<td>fav = 28</td>
<td>fav = 3</td>
<td>fav = 12</td>
<td>fav = 8</td>
</tr>
<tr>
<td></td>
<td>p = .89</td>
<td>p = 1.0</td>
<td>p = .167</td>
<td>p = .803</td>
</tr>
<tr>
<td><strong>Panel C</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Next 100 companies</td>
<td>n = 75</td>
<td>n = 19</td>
<td>n = 33</td>
<td>n = 9</td>
</tr>
<tr>
<td></td>
<td>fav = 51</td>
<td>fav = 15</td>
<td>fav = 21</td>
<td>fav = 4</td>
</tr>
<tr>
<td></td>
<td>p = .003</td>
<td>p = .005</td>
<td>p = .165</td>
<td>p = 1.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>p</th>
<th>refers to two-tailed probability levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>fav</td>
<td>refers to number of graphs favourably distorted</td>
</tr>
</tbody>
</table>

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material inconsistency in terms of GDI values. While Taylor and Anderson's findings indicated that distorted graphs did influence users' perceptions, they provided no GDI-type measure of the extent of distortion in the graphs they used. Steinbart resorted to a visual examination of different levels of distortion to reach the conclusion that a GDI of +100% or -30% represented material inconsistency. The GDI has a range of -100% to +100. Therefore, negative GDI values are not proportional to positive GDI values. Steinbart's negative cut-off is contrary to Tufte's note (p. 57) that the logarithm of the lie factor (GDI) can be taken in order to compare overstating and understating distortions. On this basis, a +100% GDI equates to a -50% GDI. Based on this analysis, a cut-off of +100% GDI and -50% GDI was used to establish material inconsistency.

Applying these values, 16 of 381 graphs (4.2%) of key financial variables could be considered to be materially inconsistent (10 exaggerating the change, 6 understating it). Using these cut-offs, it can be shown that 36 (5.2%) of Steinbart's sample of 698 graphs would have been considered materially inconsistent.

SUMMARY AND CONCLUSIONS

The descriptive results indicate extensive use of graphs, with the types of graph, topics graphed and the extent of graph usage by listed companies in Australia similar to that documented in studies of US and UK companies.

This paper investigates selectivity, that is the relationship between the use of graphs and company performance (H1). For the sample of 143 companies, no significant relationship between these variables was found. This result contrasts with those found in US and UK studies. However, when the sample was partitioned by market capitalisation, it was shown that smaller companies (ranked 51-150) are significantly more likely to include graphs of key financial variables when their performance improves.

Further analysis shows a significant relationship between changes in key financial variables graphed (1992 compared to 1991) and the company's performance on that variable, but only for smaller companies.

The relationship between distortion of graphs and company performance (H2) was also addressed. Using either the year-to-year change in operating profit before tax or the change in the variable being graphed as measures of performance, no significant overall relationship between distortion and company performance was found. This contrasts with both the US and UK studies. However, when performance was measured in terms of the change in the variable being graphed over the period of the graph, a significant result is found overall and for smaller but not larger companies.

NOTES

1 The focus of this study is on establishing the extent of selectivity in the presentation of graphs in annual reports, and distortion in the construction of the graphs. The effect of graphics on users' perceptions (see, for example, Cleveland 1985 Ch. 4, Lewandowsky and Spence 1989) and the cognitive implications of presenting data in graphics (see, for example, Kosslyn 1985, 1989) are beyond the scope of this study. Note, however, that previous accounting research (for example, Taylor and Anderson 1986, Moriarity 1979) has established that graphic presentation, depending on the decision task and context, does affect financial statement users' perceptions and decision-making.

2 Steinbart also considered whether the numerical values presented in the graphs matched the numbers presented in the financial statements. This was found to be so in every case (a result also found by Johnson, Rice and Roemmich 1980) and this issue has not been addressed in subsequent research.

3 Other forms of selectivity, such as the number of periods graphed or the definition of the variables graphed are not considered. Note that, for consistency with prior studies, both H1 and H2 are tested only using graphs present in annual reports of listed companies.

4 EPS was also considered as a basis for classifying company performance. However, as a number of companies did not disclose an EPS figure, change in operating profit before tax was preferred.

5 As at December 1992, the top 50 Australian listed companies represented 78% of the total market capitalisation of all Australian Stock Exchange listed companies (Source: Stock Exchange Journal).

6 The extent of distortion in graphs appearing in widely circulated publications was also assessed. Twelve graphs were selected from late-1992 issues of each of Business Review Weekly, The Australian Financial Review and The Age, giving a sample of 36 graphs. The method of graph selection was systematic. For example, the first graph in every issue of Business Review Weekly between 1 October 1992 and 31 December 1992 was selected. Using the 5% cut-off, it was found that 30 or 83.3% of the graphs were materially distorted, with a mean GDI of 3,666.3%. Of these graphs, 28 were exaggerated and 2 were understated.
7 The definitions of exaggeration and understate-
ment use 5% to differentiate distortion from measure-
ment error. This cut-off was suggested by Tufte
(1983) and followed by Beattie and Jones (1992). But
there is no evidence to suggest that a difference of
this magnitude is a material inconsistency.
8 However, all of the audit reports in these financial
statements were unqualified.

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