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A COMPARATIVE ANALYSIS OF FIGURE OUT AND WORK OUT IN FOUR CORPORA

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ABSTRACT

The ultimate goal of this paper is to provide a comparative analysis of figure out and Work out in the COHA, HC, COCA, and BNC. A major point to note is that figured out is preferred over to work out by Americans. A further point to note is that figure out and Work out were the most preferred ones for Americans in 2010. It is worth noting that Work out is preferable to figure out in the British parliament. It is noteworthy, on the other hand, that Work out was the most preferred one for British politicians in 1960, whereas figure out was the most preferred one for British politicians in 1980. The COCA clearly shows that figure out ways is the most preferable one for Americans, followed by figure out things, figure out life, and figure out problems. The COCA also shows that Work out problems is the most preferred one for Americans, followed by Work out differences, and Work out details. Additionally, it is worthwhile noting that the nouns problems, solutions, things, and ways are the collocations of both figure out and Work out. The BNC clearly indicates, on the other hand, that Work out ways is the most preferred by the British, followed by Work out damage, and Work out hits. Finally, it is interesting to point out that the nouns ways, problems, and solutions are the collocations of both American type and British type. This in turn suggests that Work out in American English is identical in its meaning with Work out in British English, but the collocations of Work out are slightly different.

KEYWORDS: *Type, Token, Corpus, COCA, COHA, BNC, HC, Figure Out, Work Out*

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INTRODUCTION

This paper aims to provide a comparative analysis of *figure out* and *Work out* in the Hansard Corpus, the Corpus of Historical American English, the Corpus of Contemporary American English, and the British National Corpus. First, we consider the frequency of *figure out* and *Work out* and compare two types in the COHA. Second, we examine the frequency of two types and differentiate between them in the HC. Third, we observe the collocations of *figure out* and *Work out* in the COCA. Finally, we consider how much *figure out* and *Work out* are co-related with each other and capture their subtle difference in terms of the software NetMiner. Additionally, we try to compare the collocations of *Work out* in the COCA and those of *Work out* in the BNC. As Murphy (2016, 2019) points out, the types *Work out* and *figure out* have the following meaning:

> Work out or figure out=understand, think about a problem and find an answer.

The organization of this paper is as follows. In section 2, we argue that *figure out* is preferable to *Work out* in America. It is worth pointing out that *figure out* reached a peak in 2010 (1,532 tokens). This in turn implies that *figure out*

was the most preferred one for Americans in 2010. It should be pointed out, on the other hand, that *Work out* had the lowest frequency (11 tokens) in 1820, whereas *Work out* was the most preferred one for Americans in 2010. In section 3, we maintain that *Work out* is favoured over *figure out* in the British parliament. With respect to the frequency of *Work out*, it is worth pointing out that it reached a peak (3,408 tokens) in 1960. This in turn indicates that *Work out* was the most preferred one for British politicians. It is worth noting, on the other hand, that *figure out* reached a peak (64 tokens) in 1980. This in turn shows that *figure out* was the most preferred one for British politicians. In section 4, we contend that *figure out ways* is the most preferable one for Americans, followed by *figure out things*, *figure out life*, and *figure out problems*. We also contend that *Work out problems* is the most preferred one for Americans, followed by *Work out differences*, and *Work out details*. Additionally, we show that the nouns *problems*, *solutions*, *things*, and *ways* are the collocations of both *figure out* and *Work out*. This may imply that *figure out* is slightly different from *Work out* in its use. In section 5, we argue that *Work out ways* is the most preferred by the British, followed by *Work out damage*, *Work out hits*, and *Work out lighting*. Finally, we show that the nouns *ways*, *problems*, and *solutions* are the collocations of both American type and British type. This in turn indicates that the collocations of *Work out* in American English are slightly different from those of *Work out* in British English.

The Frequency of Figure out and Work out in the COHA

In what follows, we compare the use of *figure out* and that of *Work out* in the COHA (from 1820 to 2010). Table 1 shows the frequency of *figure out* and *Work out* in the COHA: Table 1 clearly shows that *figure out* was preferable to *Work out* in America. The overall frequency of *figure out* is 6,383 tokens, whereas that of *Work out* is 5,759 tokens. This in turn indicates that *figure out* was preferred over *Work out* by Americans. It is thus reasonable to assume that Americans preferred using *figure out* to using *Work out*.

Now the following graph shows the difference in the use of *figure out* and *Work out* in the COHA:

More interestingly, there was a gradual rise in the figure of *figure out* from 1820 to 1910 except 1830. There was a rise of 82 tokens in that period. It should be noted, however, that there was a sudden decrease in the figure of *figure out* (a fall of 12 tokens) in 1920. More importantly, there was a steady increase in the figure of *figure out* from 1920 to 1950 and then there was a sudden decrease in 1960. Noteworthy is that there was a dramatic increase in the figure of *figure out* from 1970 to 2010. The frequency of *figure out* was 531 tokens in 1970, whereas that of *figure out* was 1,532 tokens in 2010. Specifically, there was a rise of 1,001 tokens in that period. This in turn indicates that Americans preferred using *figure out* in that period. It is worthwhile noting that *figure out* had no frequency in 1830 (0 token). This in turn shows that *figure out* was the least preferred one in all periods. It is also worthwhile pointing out that *figure out* reached a peak in 2010 (1,532 tokens). This in turn implies that *figure out* was the most preferred one for Americans in 2010.

Interestingly, there was a gradual rise in the figure of *Work out* from 1820 to 1840. However, there were slight fluctuations in the figure of *Work out* from 1850 to 1880. More importantly, there was a steady increase in the figure of *Work out* from 1890 to 1950. In 1890, the frequency of *Work out* was 127 tokens, whereas in 1950, that of *Work out* was 499 tokens, thus showing a gradual increase. More importantly, there was a sudden decline in the figure of *Work out* in 1960 (a fall of 13 tokens) and then there was a steady rise in the figure of *Work out* from 1970 to 2010 except 1990. It is worth noting that *Work out* had the lowest frequency (11 tokens) in 1820. This in turn implies that *Work out* was the least preferred one. It is also worth pointing out that *Work out* reached a peak (629 tokens) in 2010. This in turn suggests that *Work out* was the most preferred one for Americans in 2010. Most importantly, the frequency of *Work out* was higher than

that of *figure out* from 1820 to 1970. Conversely, the frequency of *figure out* was much higher than that of *Work out* from 1980 to 2010. From all of this, it is clear that *Work out* was preferable to *figure out* from 1820 to 1970, but *figure out* was preferred over *Work out* by Americans from 1980 to 2010.

The average of the frequency of *figure out* is 319.1, whereas that of the frequency of *Work out* is 288.0. This in turn indicates that *figure out* is favoured over *Work out* in America. On the other hand, the standard deviation (SD) of *figure out* is 465.0, whereas that of *Work out* is 219.4. The frequency of *figure out* is roughly larger than 319.1-465.0 and smaller than 319.1+465.0. On the other hand, the frequency of *Work out* is roughly larger than 288.0-219.4 and smaller than 288.0+219.4.

Table 1: Frequency of Figure out and Work out in the COHA

Year	Frequency of Figure out	Frequency of Work out
1820	1	11
1830	0	26
1840	2	76
1850	3	78
1860	3	77
1870	4	83
1880	4	81
1890	8	127
1900	26	132
1910	83	264
1920	71	238
1930	221	342
1940	276	397
1950	361	499
1960	339	486
1970	531	551
1980	581	552
1990	989	528
2000	1,348	582
2010	1,532	629
All	**6,383**	**5,759**
Average	**319.1**	**288.0**
Standard deviation	**465.0**	**219.4**

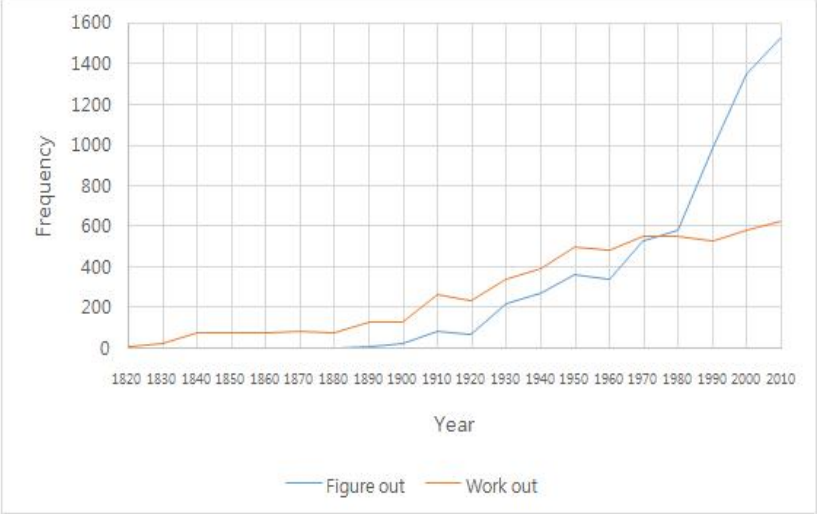

Figure 1: Frequency of Figure out and Work out in the COHA.

The Frequency of Figure out and Work out in the HC

We aim to compare the frequency of *figure out* and that of *Work out* and differentiate between two types. Table 2 shows the frequency of *figure out* and *Work out* from 1800 to 2000:

Table 1 clearly indicates that *work out* was preferred over *figure out* by British politicians. This stems from the fact that the overall frequency of *Work out* is 22,881 tokens, whereas that of *figures out* is 291 tokens. As observed earlier, Americans preferred using *figure out* to using *Work out*, but the British politicians preferred using *Work out* to using *figure out*. It is thus reasonable to assume that there is a national variation with respect to the use of *figure out* and *Work out*. The following graph shows the difference in the use of *figure out* and *Work out* in the HC:

As alluded to in Figure 2, there were slight fluctuations in the figure of *Work out* from 1800 to 1840. It should be pointed out, however, that there was a rise of 79 tokens from 1800 to 1840. From this it can be inferred that British politicians came to use this type frequently. It is important to point out that there was a dramatic increase in the figure of *Work out* 1850 to 1960. To be more specific, there was an increase of 3,333 tokens from 1850 to 1960. This in turn suggests that British politicians preferred using *Work out*. More interestingly, there was a dramatic decline in the figure of *Work out* from 1960 to 2000. It is interesting to note that *Work out* had the lowest frequency (5 tokens) in 1810. This in turn implies that *Work out* was the least preferred one in 1810. It is important to note, on the other hand, that *Work out*reached a peak (3,408 tokens) in 1960. This in turn indicates that *Work out* was the most preferred one for British politicians.

Now attention is paid to the frequency of *figure out* from 1800 to 2000. Most interestingly, *figure out* had no frequency from 1800 to 1890 except 1880. The reason why this took place is that British politicians may have used *Work out* instead of *figure out* in that period. This stems from the fact that the frequency of *Work out* was much higher than that of *figure out* from 1800 to 1890. It is worth pointing out that there was a steady increase in the figure from 1930 to 1980. Specifically, there was a rise of 58 tokens. It should be noted, however, that there was a steady decline in the figure of *figure out* from 1980 to 2000. It is important to point out that *figure out* reached a peak (64 tokens) in 1980. This in turn shows that *figure out* was the most preferred one for British politicians. It is also important to note that the frequency of *Work out* was much higher than that of *figure out* in all periods (from 1800 to 2000). We take this as indicating that British politicians preferred using *Work out* to using *figure out* in all periods.

More importantly, the average of the frequency of *Work out* is 1,089.6, whereas that of the frequency of *figure out* is 13.9. This in turn shows that *Work out* is preferred over *figure out* by British politicians. On the other hand, the standard deviation (SD) of *Work out* is1156.6, whereas that of *figure out* is 21.0. Thus, the frequency of *Work out* is roughly larger than 1089.6-1156.6 and smaller than 1089.6+1156.6. On the other hand, the frequency of *figure out* is roughly larger than 13.9-21.0 and smaller than 13.9+21.0.

Table 2: Frequency of Figure out and Work out in the HC

Year	Frequency of Figure out	Frequency of Work out
1800	0	12
1810	0	5
1820	0	16
1830	0	95
1840	0	91
1850	0	75
1860	0	89
1870	0	123
1880	1	238
1890	0	381
1900	3	763
1910	6	953
1920	7	1,107
1930	6	1,496
1940	12	1,932
1950	17	2,640
1960	33	3,408
1970	47	3,098
1980	64	2,597
1990	61	2,493
2000	34	1,269
All	**291**	**22,881**
Average	**13.9**	**1089.6**
Standard deviation	**21.0**	**1156.6**

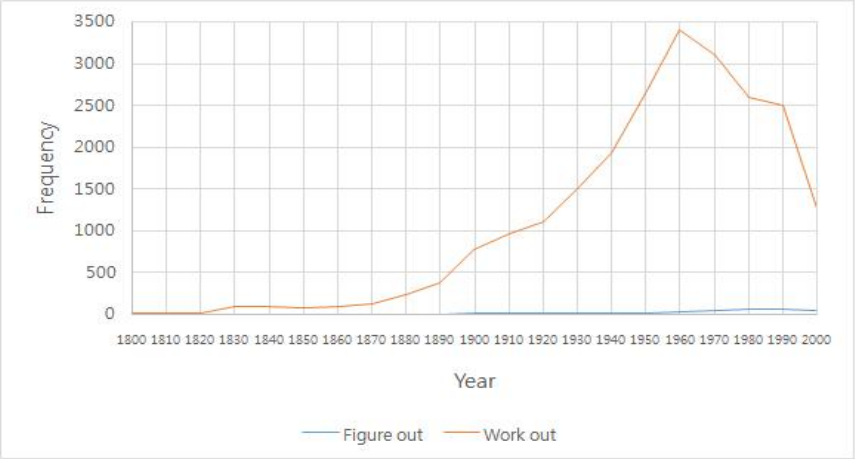

Figure 2: Frequency of Figure out and Work out in HC.

A Collocation Analysis of Figure out and Work out in the COCA

In this section, we aim to consider the collocations of *figure out* and *Work out* and differentiate between them. Table 3 shows the frequency of the collocations of *figure out* in the top 25:

Table 3 clearly shows that *figure out ways* is the most frequently used (293 tokens) in America. This in turn implies that *figure out ways* is the most preferred one for Americans. As alluded to in Table 3, the expression *figure out ways* is the most preferable one for Americans, followed by *figure out things*, *figure out life*, *figure out problems*, *figure out solutions*, and *figure out way*. It is interesting to note that *figure out life* is the third most preferred one in America. It is also interesting to point out, on the other hand, that *figure out problems* is the fourth most preferred one in America. More

interestingly, the expression *figure out people* is the tenth most preferred one in America. Additionally, it should be pointed out that *figure out answers* ranks twelfth in the COCA. We thus conclude that the expression *figure out ways* is the most preferred one for Americans.

Now let us turn to the visualization of the collocations of *figure out* in the COCA:

As illustrated in Figure 3, twenty five nouns are linked to *figure out*. These nouns are the collocations of *figure out* and frequently used with it. As observed earlier, the nouns *ways*, *things*, *life*, and *problems* are the preferable ones for Americans along with *figure out*.

Now let us turn our attention to the collocation of *Work out* in the top 25:

Table 4 clearly shows that *Work out problems* is the most widely used in America. This in turn suggests that *Work out problems* is the most preferred one for Americans. As indicated in Table 4, *Work out problems* is the most preferred one for Americans, followed by *Work out differences*, *Work out details*, *Work out solutions*, and *Work out things*, in that order. It is worthwhile pointing out that *Work out problems* is the most commonly used one in America, whereas *figure out problems* is the fourth most preferred one. It is noteworthy, on the other hand, that *Work out solutions* and *figure out solutions* are the fourth most preferred ones in America. More interestingly, *Work out things* is the fifth most preferred one in America, whereas *figure out things* is the second most preferred one. Additionally, *Work out ways* is the seventh most preferred one in America, whereas *figure out ways* is the most widely used one in America. We thus conclude that *Work out problems* and *figure out ways* are the most preferred ones for Americans.

Now let us turn to the visualization of the collocations of *figure out* and *Work out*:

As exemplified in Figure 4, forty six nouns are linked to *Figure out* and *Work out*, respectively. These forty six nouns have a collocation relationship with *figure out* and *Work out*. Most importantly, four of forty six nouns are linked to both *figure out* and *Work out*. This in turn suggests that only four nouns (*problems*, *solutions*, *things*, and *ways*) are the collocations of both *figure out* and *Work out*. From all of this, it is clear that *figure out* and *Work out* are interchangeably used, but they are low similarity synonyms.

Table 3: Collocation of Figure out in the COCA

Number	Collocation of Figure out	Frequency
1	Figure out ways	293
2	Figure out things	35
3	Figure out life	14
4	Figure out problems	10
5	Figure out solutions	10
6	Figure out way	8
7	Figure out what's	8
8	Figure out strategies	7
9	Figure out time	7
10	Figure out people	5
11	Figure out travel	5
12	Figure out answers	4
13	Figure out math	4
14	Figure out Mr	4
15	Figure out songs	4
16	Figure out stuff	4
17	Figure out fractions	3
18	Figure out fact	3

Table 3 Contd.,

19	Figure out dinner	3
20	Figure out fire	3
21	Figure out costs	3
22	Figure out chemistry	3
23	Figure out alternatives	3
24	Figure out guys	3
25	Figure out kind	3

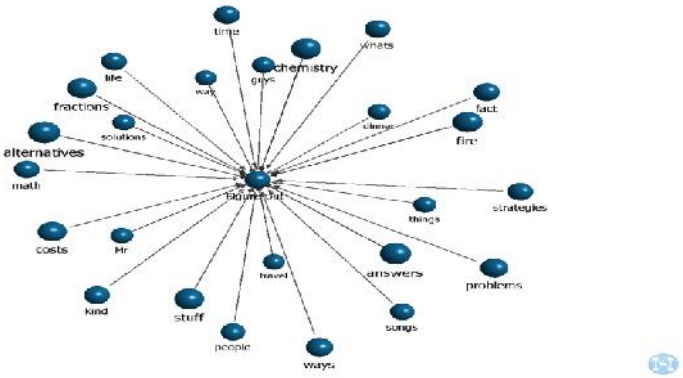

Figure 3: Visualization of the Collocations of Figure out in the COCA

Table 4: Collocation of Work out in the COCA

Number	Collocation of Work out	Frequency
1	Work out problems	31
2	Work out differences	26
3	Work out details	26
4	Work out solutions	20
5	Work out things	16
6	Work out arrangements	15
7	Work out ways	14
8	Work out kinks	10
9	Work out issues	10
10	Work out agreements	9
11	Work out deals	8
12	Work out plans	8
13	Work out compromises	7
14	Work out payment	7
15	Work out ideas	5
16	Work out conflicts	5
17	Work out clothes	4
18	Work out day	4
19	Work out disagreements	4
20	Work out methods	4
21	Work out rules	4
22	Work out situations	4
23	Work out language	3
24	Work out days	3
25	Work out difficulties	3

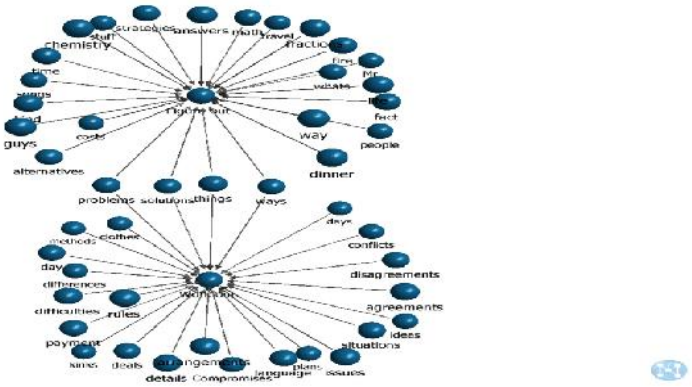

Figure 4: Visualization of the Collocations of Figure out and Work out in the COCA.

A Collocation Analysis of Work out in the BNC

In what follows, we aim to examine the collocation of *Work out* in the BNC. Also, we try to compare the results from the COCA and BNC in the top 25. It is interesting to note that in the BNC, nouns which are supposed to be used with *figure out* show no frequency. For this reason, we compare the collocations of *Work out* in the COCA and BNC. Table 5 shows the frequency of the collocation of *Work out* in the BNC:

Table 5 clearly shows that *Work out ways* is the most frequently used in the UK. This in turn shows that *Work out* ways is the most preferred one for the British. As alluded to in Table 5, *Work out ways* is the most preferred by the British, followed by *Work out damage*, *Work out hits*, *Work out lighting*, *Work out problems*, *Work out access*, and *Work out calories*, in descending order. It is interesting to point out that *Work out calories* is the fourth most preferred one in the UK. It is worthwhile pointing out, on the other hand, that *Work out world* is the eighth most preferred one in the UK. More interestingly, *Work out ways* is the seventh most preferred one in America, whereas it is the most commonly used one in the UK. As observed earlier, *Work out problems* is the most widely used one in America, whereas it is the fourth most preferred one in the UK. Additionally, *Work out solutions* is the fourth most preferred one in America, whereas it is the eighth most preferred one in the UK. We thus conclude that in America, *Work out problems* and in the UK, *Work out ways* are the most preferred ones.

Now let us turn to the visualization of the collocations of *Work out* in the COCA and BNC:

As exemplified in Figure 5, particular nouns are linked to *Work out* in American English and they are linked to *Work out* in British English. Most importantly, three of forty seven nouns are linked to both American type and British type. This in turn shows that these three nouns (*ways*, *problems*, and *solutions*) are the collocations of both American type and British type. We thus conclude that *Work out* in American English is identical in its meaning with *Work out* in British English, but the collocations of *Work out* are slightly different.

Table 5: Collocation of Work out in the BNC

Number	Collocation of Work out	Frequency
1	Work out ways	9
2	Work out damage	7
3	Work out hits	4
4	Work out lighting	2
5	Work out problems	2
6	Work out access	2
7	Work out calories	2

8	Work out yardages	1
9	Work out wounds	1
10	Work out world	1
11	Work out budgets	1
12	Work out vat	1
13	Work out threats	1
14	Work out summaries	1
15	Work out steps	1
16	Work out step	1
17	Work out sound	1
18	Work out songs	1
19	Work out solutions	1
20	Work out sine	1
21	Work out shifts	1
22	Work out sales	1
23	Work out salaries	1
24	Work out rotas	1
25	Work out pupil	1

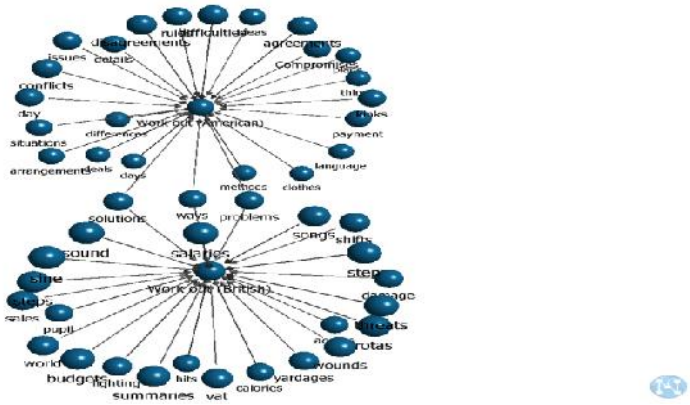

Figure 5: Visualization of the Collocations of Work out in the COCA and BNC.

CONCLUSIONS

To sum up, we have provided a comparative analysis of *figure out* and *Work out* in the COHA, HC, COCA, and BNC. In section 2, we have argued that *figure out* is preferred over *Work out* by Americans. When it comes to the frequency of *figure out*, it is interesting to note that it had no frequency in 1830 (0 token). It is worth pointing out, on the other hand, that *figure out*reached a peak in 2010 (1,532 tokens). This in turn implies that *figure out* was the most preferred one for Americans in 2010. It should be pointed out that *Work out* had the lowest frequency (11 tokens) in 1820, whereas *Work out* was the most preferred one for Americans in 2010. In section 3, we have maintained that *Work out* is preferable to *figure out* in the British parliament. With respect to the frequency of *Work out*, it is worth pointing out that it reached a peak (3,408 tokens) in 1960. This in turn indicates that *Work out* was the most preferred one for British politicians. It is worth noting, on the other hand, that *figure out* reached a peak (64 tokens) in 1980. This in turn shows that *figure out* was the most preferred one for British politicians. In section 4, we have contended that *figure out ways* is the most preferable one for Americans, followed by *figure out things*, *figure out life*, *figure out problems*, and *figure out solutions*. We have also contended that *Work out problems* is the most preferred one for Americans, followed by *Work out differences*, *Work out details*, and *Work out solutions*. Additionally, we have shown that only four nouns (*problems*, *solutions*, *things*, and *ways*) are the collocations of both *figure out* and *Work out*. In section 5, we have argued that *Work out ways* is the most preferred

by the British, followed by *Work out damage*, *Work out hits*, *Work out lighting*, and *Work out problems*. Finally, we have shown that three nouns (*ways*, *problems*, and *solutions*) are the collocations of both American type and British type.

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