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WASP (write a scientific paper) using Excel - 2: Pivot tables

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ABSTRACT

Data analysis at the descriptive stage and the eventual presentation of results requires the tabulation and summarisation of data. This exercise should always precede inferential statistics. Pivot tables and pivot charts are one of Excel's most powerful and underutilised features, with tabulation functions that immensely facilitate descriptive statistics. Pivot tables permit users to dynamically summarise and cross-tabulate data, create tables in several dimensions, offer a range of summary statistics and can be modified interactively with instant outputs. Large and detailed datasets are thereby easily manipulated making pivot tables arguably the best way to explore, summarise and present data from many different angles. This second paper in the WASP series in *Early Human Development* provides pointers for pivot table manipulation in Excel[™].

1. Pivot tables

Data analysis and eventual presentation requires the tabulation of data. Pivot tables are one of Excel's most powerful and underutilised features, tabulation functions that immensely facilitate descriptive statistics. Pivot tables permit users to summarise and cross-tabulate data, create tables in several dimensions, offer a range of summary statistics, and can be modified interactively with instant outputs. Large and detailed datasets are easily manipulated making pivot tables arguably the best way to explore, summarise and present data from diverse angles.

For example, the dataset described in the first paper in this series (United States live births for 2007–2013 by state, gender, and month and year of birth) [1] can be conveniently manipulated as a pivot table. This is done by clicking anywhere in the dataset and then clicking the Insert tab – Pivot Table. Dragging the Pivot Table Fields on the right hand side from the top to the desired area below will generate a table as shown in the figure (Fig. 1). Fields can also be nested, e.g. adding Gender under Year in the ROWS section (bottom right of Fig. 2).

A useful additional option is the possibility to change what is displayed from the default (Sum of Births in this case) to others such as mean, standard deviation or percentage and so on by clicking on Sum of Births – Value Field Settings. These tables can also be used to count the number of unique values in a field.

2. Calculations

Right clicking in the spreadsheet displays a Show Values option that opens a window permitting additional calculations instead of the sum

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of births (Fig. 3). This function is useful, for example, in order to check whether the data is all present and accounted for.

3. Filters

It is also possible to filter data so as to view only selected parts of the dataset. This may be done in the raw data or in pivot tables. For the former, the option is by clicking the Data tab – Filter. Drop-downs appear next to each header (Fig. 4) and these allow filtering options. The same drop-down options are available at the top left hand side of pivot tables and these drop-downs also permit other useful functions such as sorting.

4. Grouping

It may be useful to group data and this may be done for the raw data by selecting it, click the Data tab, Group. It is also possible to do this in pivot tables. In the births sheet, click on any year, click group and the following dialog box allows the user, for example, to group in two year intervals (Figs. 5 and 6). It is also possible to select just a range within the values being studied by using the control key while selecting, prior to grouping.

5. Field renaming

A pivot table will generate new results that will be "Sum of" or "Count of". These can be overwritten with new names for ease of use and reference.

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III COLUMNS Month

Σ VALUES

Sum of Births

Year

Σ VALUES

Sum of Births 🔻

0	P	Q	R	S	т	U	V	W		
Sum of Birt (Column 💌								PivotTable	Fields
Row Lab -	2007	2008	2009	2010	2011	2012	2013	Grand Total		
January	354943	356457	337980	323249	320477	316315	323691	2333112	Choose fields to a	dd to report:
February	326891	338521	316641	301994	297961	304505	291748	2178261	State	
March	360828	350630	347803	338613	330151	324322	320529	2372876	V Year	
April	338224	346397	337272	325028	313275	306700	311645	2278541	Month	
May	362319	354886	345257	328273	326647	330146	329520	2377048	Gender	
June	358606	348587	346971	334535	337280	327189	319779	2372947	Births	
July	379616	375384	368450	345199	345560	347542	349158	2510909	MORETARIES	
August	390378	373333	359554	349747	359404	361114	353485	2547015	MORE TABLES	
September	366904	367965	361922	350745	345548	340113	338008	2471205	Drag fields between	areas below:
October	369324	357875	347625	336809	328488	345497	340562	2426180		1
November	353660	323788	320195	326220	321479	325146	318482	2288970	T FILTERS	III COLU
December	354540	353871	340995	338974	327320	324252	335574	2375526		Year
Grand Tota	4316233	4247694	4130665	3999386	3953590	3952841	3932181	28532590		
									ROWS	Σ VALU
									Month 🔻	Sum of E

Fig. 1. Creating a Pivot Table.

0	P	Q	R	S	т	U	V	W	X	Y	Z	AA	AB			
Sum of Birth	Colum														PivotTable	e Fields
Row Labe 🔻	January	February	March	April	May	June	July	August	Septembe	October	Novembe	Decembe	Grand Tot	é	Change Galdates	dd in course
⊇ 2007	354943	326891	360828	338224	362319	358606	379616	390378	366904	369324	353660	354540	4316233		Choose fields to a	add to report:
Female	173463	159638	176135	164834	176635	174473	184862	191138	179750	180562	173187	173485	2108162		State	
Male	181480	167253	184693	173390	185684	184133	194754	199240	187154	188762	180473	181055	2208071		V Year	
2008	356457	338521	350630	346397	354886	348587	375384	373333	367965	357875	323788	353871	4247694	Ш	✓ Month	
Female	173943	165392	171789	169295	172871	169652	183028	182399	179378	174987	158656	172915	2074305		Gender	
Male	182514	173129	178841	177102	182015	178935	192356	190934	188587	182888	165132	180956	2173389		✓ Births	
2009	337980	316641	347803	337272	345257	346971	368450	359554	361922	347625	320195	340995	4130665		MORE TABLES	
Female	165407	155103	169859	164650	168148	168566	179959	175141	177311	169353	156220	167092	2016809		Drag fields betwe	en areas helow
Male	172573	161538	177944	172622	177109	178405	188491	184413	184611	178272	163975	173903	2113856		Diag neids betwee	ten areas below
2010	323249	301994	338613	325028	328273	334535	345199	349747	350745	336809	326220	338974	3999386		FILTERS	III COLU
Female	158326	147254	165506	158422	160149	163096	168524	170905	171178	164477	159246	165368	1952451			Month
Male	164923	154740	173107	166606	168124	171439	176675	178842	179567	172332	166974	173606	2046935			
⊇2011	320477	297961	330151	313275	326647	337280	345560	359404	345548	328488	321479	327320	3953590			
Female	156579	145437	161178	152699	158883	163930	168435	175416	168624	161122	156876	160359	1929538			
Male	163898	152524	168973	160576	167764	173350	177125	183988	176924	167366	164603	166961	2024052		ROWS	Σ VALU
2012	316315	304505	324322	306700	330146	327189	347542	361114	340113	345497	325146	324252	3952841		Ver	- Sum of
Female	154663	148921	158212	149709	160673	159774	169299	176790	166081	169200	159572	158513	1931407		Candar	- Sum or i
Male	161652	155584	166110	156991	169473	167415	178243	184324	174032	176297	165574	165739	2021434		Gender	•
□ 2013	323691	291748	320529	311645	329520	319779	349158	353485	338008	340562	318482	335574	3932181			
Female	158607	142731	156006	151858	160940	155370	170181	172630	165533	166535	155126	163710	1919227			
Male	165084	149017	164523	159787	168580	164409	178977	180855	172475	174027	163356	171864	2012954			
Grand Total	2333112	2178261	2372876	2278541	2377048	2372947	2510909	2547015	2471205	2426180	2288970	2375526	28532590			

Fig. 2. Nesting variables in a Pivot Table.

6. Same field twice

It is possible to add the same field to a pivot table twice, for example, to count unique occurrences of a variable in a field.

7. Pivot table cloning

Pivot tables can be cloned so as to create different tables without altering extant ones. A pivot table can be simply copied and pasted and then modified as needed.

8. Eliminating totals and subtotals

By default, pivot tables show totals for both rows and columns. These can be eliminated via the Design tab using the totals and subtotal buttons options.

9. Empty cells

By default, empty cells will display nothing. To set your own character instead, right-click inside the pivot table and select Pivot Table options. Find the "Empty cells as:", check it and enter the desired replacement character, such as the symbol "-".

10. Autofit

By default, each time that a pivot table changes, the columns that contain data are adjusted automatically to best fit the data displayed. This will change the size of cells and graphs along the entire column length. In order to disable this feature, right-click inside the pivot table, choose PivotTable Options and uncheck "AutoFit Column Widths on Update".

11. Self-contained pivot tables

Pivot tables have a pivot cache, a repository of the data used to create the pivot table, so a pivot table will continue to function even if the original data is deleted in the spreadsheet.

12. Pivot charts

These may be created using the steps as invoking a pivot chart but in addition to creating tables, Excel also instantaneously plots the resulting pivot table as a chart. This greatly facilitates visual data Download English Version:

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