

Multi-Objective Decision Analysis for Personal Decisions

Eric Johnson, April 2024

Multi-Objective Decision Analysis (MODA) can be useful for large personal decisions.



| House | Car | <u>Job</u> |
|-------|-----|------------|
| | | |

- School
- Commute
- Price
- Size
- Neighborhood
- Safety
- Other

- Fun
- Price
- Repair
- Safety
- Gas
- Other

- Responsibilities
- Salary
- Colleagues
- Location
- Hours
- Other

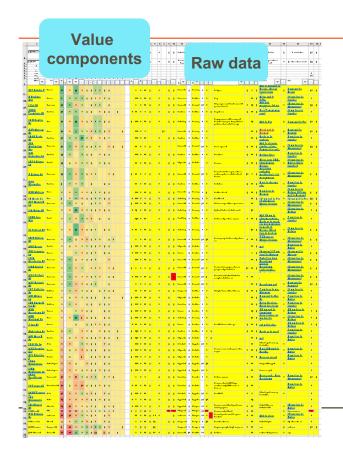
Agenda



- Making sense of it
- Pressure-testing data
- Supporting revision
- Examples

Sort by score and color-code value components.





- This is main sheet of my 2020 decision about buying a house.
- Roughly 50 rows by 50 columns, including raw data and value calculations.
- Score is the leftmost color-coded column.
- Some value components have a lot of impact; others not so much.

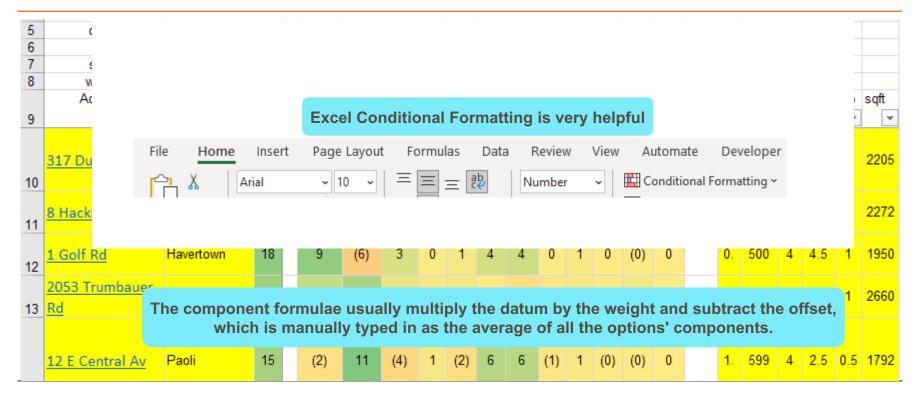
Put the most important info at left and top (FreezePanes).

| | Identity | y | Sum | | | | Va | alue | cor | npor | nent | ts | | | | | | Supp | por | ting | data | a |
|----|----------------------|--------------|-----|-------|-------------|-------|-----|-----------|-----|------------|------|------------|-----|------|------------|---|-----------|-------|-----|------|-----------|------|
| 9 | Address | Town | Nat | schoo | com mute | price | tax | roo ms | | walk to | | gar age | | pool | cen A/C | | ıv iil | price | br | bath | roo ms | sqft |
| 10 | 317 Dundee Pl | Devon | 22 | (2) | 11 | (4) | 1 | 1 | 6 | 6 | 1 | 1 | 0 | (0) | 0 | | 0. | 600 | 4 | 2.5 | 1 | 220 |
| 11 | 8 Hackney Way | Harleysville | 20 | 5 | 6 | 7 | 1 | 1 | (2) | (2) | 2 | 1 | (0) | (0) | 0 | | 0. | 445 | 5 | 2.5 | 1 | 227 |
| 12 | 1 Golf Rd | Havertown | 18 | 9 | (6) | 3 | 0 | 1 | 4 | 4 | 0 | 1 | 0 | (0) | 0 | | 0. | 500 | 4 | 4.5 | 1 | 195 |
| 13 | 2053 Trumbauer Rd | Lansdale | 16 | 5 | 7 | 2 | 1 | 1 | (0) | (2) | (1) | 1 | 0 | 1 | 0 | C |).5 | 520 | 4 | 3. | 1 | 266 |
| | 12 E Central Av | Paoli | 15 | (2) | 11 | (4) | 1 | (2) | 6 | 6 | (1) | 1 | (0) | (0) | 0 | | 1. | 599 | 4 | 2.5 | 0.5 | 179 |

Sorted with best on top and most important on the left.

Center each value component on zero, so that we can color code all the components.





Agenda



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If you score dimensions without explicitly defining a scale, put the verbal description right next to the score.



| _ | perlink to ource data | | | | Extras score is \$k/yr equivalent in the learning in the learning is \$k/yr equivalent in the learning in the learning is \$k/yr equivalent i | | n | r eig | erlink to Google naps next to hborhood score | | lively meh | | 0-15, per to walk station | c to |
|---|-----------------------|--------------|-----|-----|--|-------|------------|----------|--|---------|---------------|----------------------------|---------------------------------|-------|
| | Address | Town | Net | poo | Notes | extra | com mut | X | Location | v tc | k Trar | nsit r | ide dowr | ntown |
| 3 | 17 Dundee Pl | Devon | 22 | 0 | Brick patio. | 10 | 20 | 1 | Walk to Berwyn or Devon. Across tracks from shopping | 1 | 3 m | nin walk t | o Devon | 13 |
| 8 | Hackney Way | Harleysville | 20 | 0 | siding. | | 26 | 1 | Hotels and I-476. | C |) — | <u>min drive</u> isdale | to | 7 |
| 1 | Golf Rd | Havertown | 18 | 0 | 3 br+garage loft office. Whole house standby generator. Piano? | 6 | 41 | 1 | Map not impressive, but we loved it. | 0. | 8 | min drive nnewood | | 11 |
| _ | 053 Trumbauer d | Lansdale | 16 | 1 | Huge house | 10 | 25 | 1 | Near Towamencin creek | C |) — | min drive Isdale | to | 8 |
| 1 | 2 E Central Av | Paoli | 15 | 0 | Huge gorgeous tree. Thin office porch. Piano barely fits in living room. Dining table has to go | | 21 | | Walk to Paoli | 1 | 1 <u>4 m</u> | nin walk t | <u>o Paoli</u> | 13 |

Carving out parts of the problem allows them to be carefully considered ... on a different sheet.



Look up the data for crime (by township) and school (by district)

| 9 | Address | Town | Net | Crime Looku | cri n → | School Looku 🕶 | scho |
|----|----------------------|--------------|-----|----------------|------------|-------------------|------|
| 10 | 317 Dundee Pl | Devon | 22 | Easttown T | 1 | Conestog | -5 |
| 11 | 8 Hackney Way | Harleysville | 20 | Towamenci | 0 | North Per | 7 |
| 12 | 1 Golf Rd | Havertown | 18 | Haverford T | 2 | Haverford | 14 |
| 13 | 2053 Trumbauer Rd | Lansdale | 16 | Lansdale | 3 | North Per | 7 |
| | 12 E Central Av | Paoli | 15 | Tredyffrin Tv | 3 | Conestog | -5 |

 The scores for crime and school are lookups from sheets that address those issues.

The analysis of schools integrates many sources.



| | _ | | | | | | | | | | | | | | | | | | | | | | | | | | _ | | |
|----|------|--------------|-----------------|--|------|-------------|------|----|-----|------|----|---|--------------|-----------|------|------|----|------|-----------------|-------|-------|------|----------|----------------|----|------|---------------------------|-----|------------------|
| | | Identity, s | core | | | Valu | ue c | om | pon | ents | 5 | | | | In | terr | ne | diat | e cal | lcula | tions | | | | | Raw | v data | | |
| 5 | freq | School | school score | | cost | extras • | | _ | dCk | WR | _ | | liche avg | GS avg | | | | | N Teach 2 | | | | GS SP | Websit | | iess | GS Student Progress | T/S | N Aca- demics |
| 6 | 10 | Haverford | 14 | | 1 | 13 | 0 | -1 | 1 | 0 | 0 | | 4.1 | 9.0 | 14.5 | 0 | | 4 | 4 | 4 | 4.3 | 10.0 | 8.0 | <u>haverf</u> | 10 | | 8 | 14 | Α |
| 7 | 0 | Radnor | 12 | | 1 | 5 | 1 | -3 | 1 | 3 | 4 | | 4.2 | 8.5 | 12 | 0 | | 4.3 | 4 | 4.3 | 4.3 | 10.0 | 7.0 | rtsd.org | 10 | | 7 | 11 | A+ |
| 8 | 0 | Harriton | 6 | | 1 | -3 | 2 | -1 | 0 | 1 | 5 | | 4.3 | 9.0 | 11 | 0 | | 4.3 | 4.3 | 4.3 | 4.3 | 10.0 | 8.0 | lmsd.or | 10 | | 8 | 11 | A+ |
| 9 | 9 | North Penn | 7 | | 1 | 9 | -2 | 4 | -1 | -2 | -2 | 1 | 3.9 | 10.0 | 16 | 0 | | 4 | 4 | 4 | 3.7 | 10.0 | 10.0 | nphs.n | 10 | | 10 | 17 | Α |
| 10 | 0 | Strath Haven | 1 | | 1 | -7 | 1 | 1 | -1 | 2 | 3 | | 4.2 | 9.5 | 12.5 | 0 | | 4.3 | 4.3 | 4.3 | 4.0 | 10.0 | 9.0 | <u>wssd.o</u> | 10 | | 9 | 12 | A+ |
| 11 | 7 | Wissahickon | 0 | | 1 | -11 | 0 | 4 | 0 | 2 | 4 | | 4.2 | 10.0 | 12 | 0 | | 4.3 | 4.3 | 4.3 | 3.7 | 10.0 | 10.0 | <u>wsdwe</u> l | 10 | | 10 | 11 | A+ |

Freq of reference

Crime drill-down is similar to school drill-down.

| | - | Identity, sc | ore_ | | Valu | ie co | mponents | | | | iterme alcula | diate tions | | | Raw dat | a | | |
|----|------|------------------|----------|----|--------|-------|-----------------------|------------------|---|--------------|------------------|-----------------|-----------------------|------------------|-----------------------|------|-------------------|------------------|
| 2 | | Diff www.violeyi | | m/ | 10000 | 2000 | 100 | 3 | | | | | V | р | v | ٧ | | |
| 3 | freq | town | impact x | | murder | rape | aggravated assault | larceny theft | X | our share | pop 100ks | imputed rape | aggravated assault | larceny theft | murder manslaugher | rape | prop incidents | prop inc/100k |
| 4 | 1 | Abington Twp | .5 | | 0.0 | 0.1 | 0.3 | 0.2 | | .0001 | .6 | 1.0 | 52 | 1037 | 0 | 1 | 1258 | 2200 |
| 6 | 0 | Chester Twp | 1.8 | | 0.0 | 0.7 | 1.0 | 0.1 | | .0003 | .1 | 1.0 | 30 | 55 | 0 | 1 | 95 | 1,100 |
| 7 | 0 | Collegeville | 2.0 | | 0.0 | 1.7 | 0.2 | 0.1 | | .0009 | .0 | 1.0 | 2 | 33 | 0 | 1 | 45 | 1,300 |
| 8 | 0 | Doylestown | 7.0 | | 3.5 | 2.9 | 0.4 | 0.2 | | .0004 | .1 | 4.1 | 12 | 148 | 1 | | 179 | 2,100 |
| 9 | 3 | Easttown Twp | 1.2 | | 0.0 | 0.1 | 0.0 | 0.1 | 1 | .0004 | .1 | .1 | 1 | 84 | 0 | | 98 | 1300 |
| 10 | 0 | Frazer Twp | 2.1 | | 0.0 | 1.6 | 0.0 | 0.5 | | .0008 | .0 | 1.0 | 0 | 224 | 0 | 1 | 228 | 6,000 |
| 11 | 1 | Hatfield Twp | 1.9 | | 0.0 | 0.7 | 0.1 | 0.1 | 1 | .0002 | .2 | 2.0 | 6 | 184 | 0 | 2 | 216 | 1300 |
| 12 | 0 | Hatboro | | | 0.0 | 0.0 | 0.0 | 0.1 | | .0005 | .1 | .0 | 0 | 60 | 0 | | 75 | 1,300 |
| 13 | 10 | Haverford Twp | 1.9 | | 0.0 | 0.7 | 0.1 | 0.1 | 1 | .0001 | .4 | 5.0 | 10 | 605 | 0 | 5 | 696 | 1700 |
| 15 | 5 | Lansdale | 3.0 | | 0.0 | 1.6 | 0.3 | 0.1 | 1 | 0003 | 1 | 3.0 | 12 | 173 | 0 | 3 | 196 | 1700 |

Freq of reference

I had to do the math to make the data per-capita.

Allowing pairwise comparisons of options supports pressure-testing of attribute weights



| 4 | Α | В | C | D E | F | G | H | 1 | J | K | L | M | N | 0 | Р | Q | R | S | Т | U | V | W | X | Υ | Z | AA | AB | AC | AD | AE | AF | AG | AH |
|---|-----------------|----------|-----|-------|-------|-------|-----|------|------|------|------|-----|------|------|-----|---|-----|-------|----|------|-----|------|-----|---------|-----|------|-------------------|-----|---------------|-----|-----|------|---|
| 1 | 12 E Central Av | ilc | 15 | -2.2 | 10.6 | -3.6 | .9 | -2.4 | 6.4 | 5.9 | -1.3 | .9 | 2 | 1 | .1 | | 1. | 599 | 4 | 2.5 | 0.5 | 1792 | .4 | 1928 | 1 | 1 | Tredyffrin Twp | 3.4 | Conesto ga | -5 | 6 | 0 | Huge gorgeous tree. Thin office porch. Piano barely fits in living room. Dining table has to go downstairs. Only one bathroom upstairs. |
| 2 | 1 Golf Rd | town | 18 | 9.3 | -6.0 | 3.4 | .5 | 1.1 | 3.7 | 4.3 | .2 | .9 | .2 | 1 | .1 | | 0. | 500 | 4 | 4.5 | 1 | 1950 | .2 | 1935 | 1 | 1 | Haverford Twp | 1.9 | Haverford | 14 | 7 | 0 | 3 br+garage loft office. Whole house standby generator. Piano? |
| 3 | diff | | -3 | -11.6 | 16.7 | -6.9 | .5 | -3.5 | 2.6 | 1.6 | -1.5 | - | 4 | - | - | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | offset | | | -1 | -28 | -38 | -7 | 6 | 11 | 2 | -2 | 4 | 0 | 0 | 1 | | | | | | | | | | | | | | | | | | |
| 6 | avg | | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | |
| 7 | stdev | | | 8 | 7 | 5 | 2.8 | 2.4 | 3.0 | 2.4 | 2.1 | 1.7 | 0.7 | 0.4 | 0.2 | | | | | | | | | | | | | | | | | | |
| 8 | weight | | | 1 | 83 | 07 | -1 | 7 | 1.3 | 8 | -1 | 4.9 | .07 | 1.4 | 0.7 | | | | | | | | | | | | | | | | | | |
| | Address | Town | Net | schoo | com | price | tax | roo | tran | walk | cri | gar | extr | pool | cen | | av | price | br | bath | гоо | sqft | acr | e built | gar | cent | Crime | cri | School | sch | tax | pool | Notes |
| 9 | | ~ | ₩. | ¥ | mu' 🕶 | - | - | m 🕶 | SĺΨ | to ▽ | n 🕶 | a 🔻 | a 🔻 | ₩ | A/ | ₩ | å Ψ | _ | 7 | - | n 🔻 | | | ~ | | | | n 🕶 | Looku → | ¥ | - | ₩ | |

- The drop-downs let you select any two options and compare them right at the top of the spreadsheet.
- Do I really believe that this one is better than that one?
- Or am I over/under valuing one of the attributes?

Agenda



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- Pressure-testing data
- Supporting revision
- Examples

Using MODA is an evolutionary process, and the tools we use must support this evolution.



Kinds of Evolution

- Definitions of criteria evolve.
- Weights of criteria evolve.
 - commute time, sq ft
- Options get added.
- We gather information about the options.

Examples of Evolving Definitions

- Car age => reliability
- Nature of work => capturing expertise in a model, decision process, doing other stuff
- Home location => commute time, walk to commerce & transit
- Home size => rooms
- Home: add safety & groundskeeping
- Home view => nature, water, distance

Let yourself get the structure right.



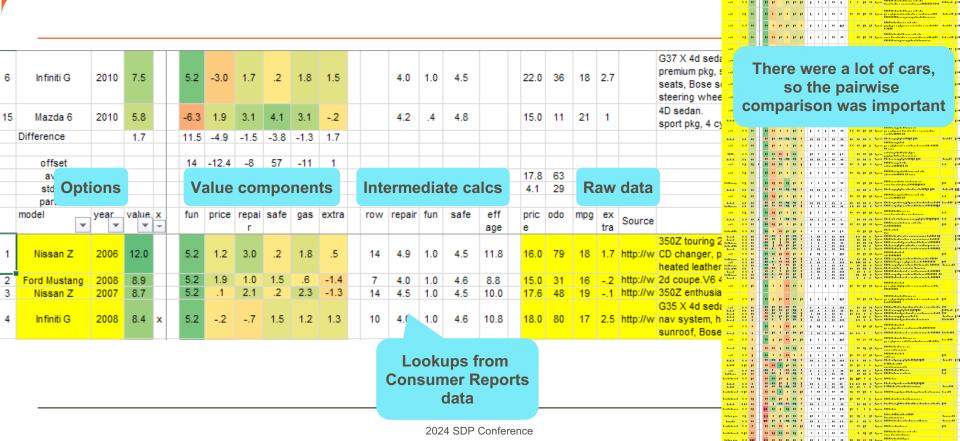
- Be willing to move rows or columns around to make a tool that lets you
 do the kind of thinking you need to do.
- Use robust spreadsheet techniques:
 - =INDEX(dataColumn, MATCH(item, keyColumn, 0))
 rather than VLOOKUP, so that you can rearrange columns if needed.
 - When summing across a group of columns (e.g. value components), put little empty columns to left and right, and sum from these. This way, if you move the first or last data column into the middle, your SUM still picks up all the columns.

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Cars



Drill-down data for Cars



| | | | | | 5 | Safety | | | | | | | | | | | F | Repair | | | | |
|----------------|-------|------|------|------|------|--------|------|------|------|------|----|-----|--------------|------|------|------|------|--------|------|------|------|------|
| • | notes | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | fı | un | Road test | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
| Acura T | | 4.6 | 4.6 | 4.6 | 4.7 | 4.7 | 4.1 | 3.7 | 3.7 | 3.7 | 0 |).5 | | 4.4 | 4.4 | 3.8 | 3.4 | 3.8 | 4.8 | 4.6 | 4.0 | 4.4 |
| Audi A4 | | 4.2 | 4.2 | 4.2 | 4.8 | 4.8 | 4.0 | 4.0 | 4.6 | | 0 |).5 | | | | | | 3.0 | 3.0 | 3.0 | 5.0 | 4.0 |
| Audi S4 | | 4.2 | 4.2 | 4.2 | 4.8 | 4.8 | 4.0 | 4.0 | 4.8 | 4.8 | | 1 | | | | | | 3.0 | 3.0 | 3.0 | 5.0 | 4.0 |
| Cadillac CTS | | 4.2 | 4.2 | 4.6 | 4.4 | 4.4 | 4.4 | 4.8 | 4.8 | 4.8 | | 1 | | 3.0 | 3.0 | 3.0 | 3.5 | 3.5 | 4.0 | 3.0 | | |
| Ford Focus | sedan | 3.8 | 4.0 | 4.2 | 4.2 | 4.2 | 4.2 | 4.4 | 4.4 | | 0 |).4 | 74 | 4.0 | 3.0 | 4.0 | 4.0 | 4.0 | 4.0 | 1.0 | 1.0 | 1.0 |
| Ford Mustang | V8 | 4.2 | 4.2 | 4.6 | 4.6 | 4.8 | 4.2 | 4.2 | 4.2 | | | 1 | 83 | 4.0 | 5.0 | 4.0 | | 3.0 | 3.0 | 2.0 | 4.0 | 3.0 |
| Honda Accord | V6 | 4.4 | 4.4 | 4.4 | 4.5 | 4.5 | 4.5 | 4.5 | 4.3 | | 0 |).4 | | 4.1 | 4.1 | 3.2 | 3.1 | 3.2 | 4.2 | 4.9 | 4.0 | 4.0 |
| Hyundai Sonata | V6 | 4.8 | 4.8 | 4.6 | 4.8 | 4.8 | 4.6 | 4.6 | 4.6 | | | 0 | 80 | 3.0 | 4.0 | 3.0 | 4.0 | 2.0 | | | | |
| Infiniti G | sedan | 4.0 | 4.0 | 4.6 | 4.5 | 4.5 | 4.0 | 4.0 | 4.0 | | | 1 | | 4.1 | 4.0 | 4.0 | 4.0 | 4.0 | 4.5 | 4.9 | 4.9 | 4.9 |
| Lexus IS | V8 | 4.0 | 4.0 | 4.2 | 4.2 | 4.2 | 4.0 | 4.0 | 4.2 | | 0 |).2 | | 4.0 | 3.0 | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | 5.0 | 5.0 |
| Mazda 3 | | 3.6 | 3.6 | 3.6 | 3.8 | 4.6 | 4.0 | 4.0 | 4.0 | | 0 |).3 | 78 | 3.0 | 3.0 | 4.0 | 4.0 | 4.0 | 5.0 | 5.0 | 4.0 | 4.0 |
| Mazda 6 | | 4.2 | 4.4 | 4.4 | 4.8 | 4.8 | 4.0 | 4.0 | 4.0 | | 0 |).4 | 85 | 3.0 | 3.0 | 4.0 | 4.0 | 4.2 | 4.2 | 4.2 | 4.5 | 4.0 |
| Nissan Z | | 4.5 | 4.5 | 4.7 | 4.1 | 4.1 | 4.0 | 4.0 | 4.0 | | | 1 | 86 | 4.9 | | | | 5.0 | | | | |
| Subaru Impreza | sedan | 4.2 | 4.2 | 4.6 | 4.6 | 4.6 | 4.0 | 4.0 | 4.6 | | 0 |).2 | 82 | 3.0 | | 3.0 | | 4.0 | 4.0 | 4.0 | 5.0 | 4.0 |
| Toyota Camry | SE | 4.2 | 4.8 | 4.8 | 4.8 | 4.8 | 4.6 | 4.6 | 4.6 | | | 0 | | 5.0 | 4.0 | 4.0 | 4.0 | 4.0 | 5.0 | 4.0 | 3.0 | 3.0 |
| VW GTI | ~Golf | 4.0 | 4.4 | 4.4 | 4.4 | 4.4 | 4.0 | 4.0 | 4.0 | | | 1 | | 3.0 | 3.0 | 3.0 | | 2.0 | 1.0 | 1.0 | 2.0 | 2.0 |

Jobs



| \blacksquare | Α | В | С | D | E | F | G | Н | J | K | L | M | N | 0 | Р | Q | R | S |
|----------------|-----------|-------|---|--------|-------|-------------|-------|------------|-------------|---------|-------|---|-----------------|-------|--------------|------------|------------|-------|
| 1 | offset | | | 102 | 22 | -2 | -20 | -1 | | | | | | | | | | |
| 2 | avg | | | - | -0 | 0 | -0 | - | | | | | | | | | | |
| 3 | stdev | 28 | | 23 | 15 | 9 | 7 | 3 | | | | | | | | | | |
| 4 | | | | 1 | | | | 5 | | | | | 80 | 50 | | | | 4 |
| 5 | Option | S | | | Value | e compor | nents | | Interme | diate d | calcs | | | | | Raw da | ta | |
| | | total | | | | foster | | | housing | town | rat'l | | | | foster | | | С |
| 6 | | value | | salary | hours | rationality | town | colleagues | cost | quality | : : | | salary | hours | rationality | town | colleagues | score |
| | Pharsight | | | | | | _ | | | | | | | | decision ent | | | |
| 7 | CPDP | 35 | | 18 | 14 | 11 | -6 | -1 | 30 | .5 | .6 | | 120 | 45 | system | Bay Area | name1 | 0 |
| • | | | | | | | | | | | | | | | development | | | |
| 8 | Pharsight | 35 | | 18 | 2 | 17 | -6 | 5 | 30 | .5 | 1.0 | | 120 | 50 | strategy | Bay Area | name2 | .8 |
| Ŭ | | | | | | | | | · | | | | | | power gen | | | |
| 9 | AEP | 22 | | -12 | 26 | -3 | 10 | 1 | 15 | .7 | 3 | | 90 | 40 | strat | Dallas | name4 | .0 |
| 10 | Aventis | 12 | | 8 | 2 | -6 | 9 | -1 | 18 | .9 | 5 | | 110 | | project mgmt | Jersey | | |
| 10 | Aveilus | 12 | | 0 | | -0 | | | | | 5 | | | | pharmaco- | Jersey | | |
| 11 | Pfizer | 5 | | 8 | 2 | 2 | -5 | -1 | 25 | .0 | .0 | | 110 | 50 | | New York | name5 | 4 |
| | Cabarina | 4 | | 28 | -22 | -13 | 0 | 4 | 18 | .9 | 4.0 | | 130 | 60 | economics | | 7 | |
| 12 | Schering | 10 | | | O | | 9 | -1 | | | -1.0 | | < | | same old | Jersey | name7 | 4 |
| 13 | Abt | -16 | | 18 | -22 | -3 | -5 | -4 | 25 | .1 | 3 | | 120 | 60 | smartCRO | Boston | name6 | -1.0 |
| 14 | Covance | -19 | | -22 | 2 | -3 | 4 | -0 | 18 | .3 | 3 | | | | smartCRO | Washington | | 2 |
| 15 | Brattle | -26 | | -22 | 2 | -3 | -5 | 2 | 25 | .1 | 3 | | | | smartCRO | Boston | name8 | .2 |
| | NECM | -51 | | -42 | -10 | 2 | -5 | 4 | 25 | .1 | .0 | | 60 | 55 | pharmaco- | Boston | name10 | .6 |
| 16 | INCOM | -51 | | -42 | -10 | 2 | -0 | 7 | 20 | - 1 | .0 | | 00 | 33 | economics | Doston | name to | .0 |





| | . — | _ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------------------|------|------------|-----------|--------------------------|------------|------------|-----------|-------|----------|-----|-------|---------|--------|------------|------|------|-----|-----|-----------------|----------------|------|------|------------|-----------------|--------|------|--------------------------|---------------------|----------|----------|----------|-------|-----|-----|------|--------|-------|
| The Chalesa | | 60 - | 89 | 278 | 327 | -27 | 46 | -112 | 62 | 92 | -69 | -49 | 34 | 30 | -29 | -\$ | 27 | 19 | -1 | -30 | -9 | -14 | -22 | 5 | 21 | | | | | | | | | | | | |
| Brisker Couls | 15 | - 9 | -311 | 442 | -23 | -57 | 46 | 88 | 62 | -58 | -69 | 51 | -46 | 30 | -29 | -8 | 27 | 2 | 39 | 10 | -9 | -2 | -22 | 5 | -9 | | | | | | | | | | | | |
| | - | 11 - | 400 | -164 | 350 | 30 | - | -7 | | | | *** | | | | | - | 17 | -40 | -40 | - | -12 | - | - | 30 | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Ontion | | | -1789 | 1202 | 23 | -453 | 484 | 11 | O+c | | £ 1/4 | alue | | mn | ana | nte | 3 | 31 | 1 | 30 | 9 | 14 | 22 | 25 | 9 | | Into | rme | diate | | loc | | D | 214 | da | 40 | |
| Option | 15 | | -0 | 0 | -0 | -0 | 0 | | .Oti | 5 U | I V | alue | | mp | OHE | 1112 |) | -0 | -0 | -0 | 0 | | 0 | -0 | 0 | | IIII | HIHE | ulatt | tla | 165 | | | aw | ua | la | |
| 4 | | - | 280 | 146 | 143 | 142 | 89 | | | | | | | - 1 | | | 0 | 17 | 7 | 16 | - 11 | 10 | 21 | 5 | 18 | | | | | | | | | | | | |
| ш | | | -1 | 1.2 | 350 | -10 | 530 | 20. | | | | | | | | | 100 | 50 | 40 | 40 | 30 | 0.6 | 50 | 30 | 1 | | | | | | | | _ | | | | |
| ¥ Lili ¥ | J ", | lue ▼ ∓ | | offective squ fool | | K'z | catr W | ,00 A | safe | | co 🔻 | viou of | comr 🔻 | neara P | al 🛖 | bo 🔻 | | | third bodi 🛖 | second bath | | re 🛖 | par 🛖 | tonnir nod 🛖 | extrar | y y | , offoctiv osq foo | | K' ▼ | com w | com 🔻 | upu 🕌 | • | | ol 🔻 | util 🔻 | hoo 🔻 |
| The Chateau | 6.6 | 60 | 89 | 278 | 327 | -27 | 46 | -112 | 62 | 92 | -69 | -49 | 34 | 30 | -29 | -8 | 27 | 19 | -1 | -30 | -9 | -14 | -22 | 5 | 21 | 1700 | 1233 | 1225 1238 | 48 | 48 | 48 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | - |
| Red Hauk Ranch | 62 | 29 | 294 | 15 | -23 | -11 | 46 | 88 | 62 | 92 | 31 | -16 | -46 | 30 | -29 | -8 | -6 | 2 | -1 | 10 | 21 | 23 | 28 | 5 | 21 | 1495 | 1014 | 1014 1014 | 46 | 49 | 45 | | 1.0 | .7 | 1.0 | .7 | 1.0 |
| Lartan apt | 57 | 75 | 314 | 18 | 211 | -27 | -131 | 21 | 62 | 92 | -3 | 17 | 34 | 5 | -29 | -8 | -6 | 2 | -1 | 10 | -9 | -6 | 11 | 5 | -9 | 1475 | 1017 | 950 1050 | 48 | 48 | 48 | .7 | 1.0 | .7 | .7 | .7 | .7 |
| El Camino condo | 52 | 28 | 74 | 18 | 211 | 3 | -131 | 88 | 62 | 92 | -3 | 17 | 34 | 5 | -29 | -8 | -6 | 2 | -1 | 10 | 11 | -6 | 11 | 5 | 68 | 1715 | 1017 | 850 1100 | 45 | 45 | 45 | .7 | 1.0 | .7 | .7 | .7 | 1.0 |
| Louira | 52 | | 389 | -122 | 327 | -27 | 46 | -112 | 62 | 92 | -69 | -49 | 34 | 30 | 9 | -8 | 27 | -31 | -1 | -30 | -9 | -6 | -22 | 5 | -9 | 1400 | 900 | 900 900 | 48 | 48 | 48 | 1.0 | 1.0 | 1.0 | 1.0 | - | - |
| Bgamo Canda | 52 | 20 | 74 | -82 | 211 | 3 | 46 | 88 | -22 | 92 | -3 | 17 | 34 | 30 | 21 | -8 | -6 | 2 | -1 | 10 | 11 | -6 | 11 | 5 | -9 | 1715 | | 800 1000 | 45 | 45 | 45 | .7 | .7 | .7 | 1.0 | .7 | 1.0 |
| The Summit at Skylin | | 89 | 197 | -82 | -23 | 149 | 46 | 88 | -22 | -58 | -3 | -49 | 34 | 5 | -29 | -8 | -6 | 19 | -1 | 10 | 11 | 2 | 11 | 5 | -9 | 1592 | | 800 1000 | 30 | 35 | 28 | - | .7 | .7 | 1.0 | 1.0 | 1.0 |
| Land's End | | 10 | 227 | -163 | -23 | 183 | 46 | -112 | -22 | -58 | 31 | 17 | 34 | -7 | -29 | 122 | -6 | -31 | -1 | 10 | -9 | -14 | -22 | -5 | 41 | 1562 | | 866 866 | 27 | 29 | 26 | - | .7 | .7 | 1.0 | - | - |
| Sorramonto Ridgo | | 06 | 159 | -127 | -23 | 159 | 46 | -112 | -22 | -58 | 31 | 34 | 34 | 5 | 34 | -8 | -6 | 19 | -1 | 10 | - 11 | 6 | 28 | -5 | -9 | 1630 | | 858 915 | 29 | 32 | 28 | - | .7 | .7 | 1.0 | 1.0 | - |
| Skylino Hoightr | | 98 | 285 | -252 | -23 | 149 | 46 | -112 | -22 | -58 | 31 | 34 | 34 | 30 | 34 | -8 | -6 | 19 | -1 | -3 | 11 | -6 | 28 | -5 | -9 | 1503 | | 792 792 | 30 | 33 | 29 | | .7 | .7 | 1.0 | 1.0 | - |
| Avalon Pacifica | | 35 | 83 | -2 | -23 | 136 | 46 | -45 | -22 | -58 | 31 | 34 | -46 | 5 | 21 | -8 | -6 | 19 | -1 | 10 | 11 | 2 | 11 | -5 | -9 | 1706 | | 800 1100 | 32 | 65 | 15 | - | .7 | .7 | 1.0 | 1.0 | .3 |
| Brirbano Condo | | 59 | -311 | 442 | -23 | -57 | 46 | ** | 62 | -58 | -69 | 51 | -46 | 30 | -29 | -8 | 27 | 2 | 39 | 10 | -9 | -2 | -22 | 5 | -9 | 2100 | | 1370 1370 | 51 | 67 | 43 | | 1.0 | 1.0 | 1.0 | .7 | 1.0 |
| Bolloue Aptr | | 31 | 314 | -122 | -23 | -27 | -131 | 21 | 62 | 92 | -69 | -49 | 34 | 30 | -4 | -8 | 27 | 2 | -1 | -30 | 11 | -6 | 11 | 5 | -9 | 1475 | | 800 950 | 48 | 48 | 48 | - | 1.0 | 1.0 | .7 | .7 | .7 |
| Calmalapt | | 31 | 539 | 38 | -373 | 203 | 46 | 88 | -188 | 92 | -3 | -49 | * | -45 | -29 | -8 | -73 | -31 | -1 | -30 | -9 | -8 | -22 | -5 | -9 | 1250 | | 800 1150 | 25 | 25 | 25 | -1.0 | - | - | 1.0 | - | 1.0 |
| Avalan at Codar Ridge | |)5 | 62 | -54 | -23 | 149 | 46 | -112 | -22 | -58 | 31 | 34 | * | 5 | 21 | -8 | -6 | 19 | -1 | 10 | 11 | -6 | 11 | -5 | -9 | 1727 | | 957 957 | 30 | 33 | 29 | | .7 | .7 | 1.0 | 1.0 | - |
| Skyline Vieu | | 01 | 5 | 38 | -23 | 143 | 46 | -112 | -22 | -58 | 31 | 17 | 34 | 5 | 21 | -8 | -6 | 2 | -1 | 10 | 11 | 2 | -22 | -5 | -9 | 1783 | | 800 1150 | 31 | 37 | 28 | • | .7 | .7 | 1.0 | .7 | -:- |
| Treetops Apts | | 3 | 260 | -235 | -23 | 116 | 46 | 88 | -22 | -58 | 31 | 17 | -46 | -45 | 21 | -8 | -6 | -31 | | -30 | -9 | -8 | -22 | -5 | -9 | 1529 | | 806 806 | 34 | 37 | 32 | - | .7 | .7 | 1.0 | - | 1.0 |
| Harizans West | - | 12 | -75 | -98 | -23 | 139 | 46 | -112 | -22 | -58 | 31 | 34 | -46 | , | 34 | 122 | -6 | 19 | | -30 | 11 | | 28 | -5 | -9 | 1863 | | 920 920 | 31 | 38 | 28 | | .7 | .r | 1.0 | 1.0 | - : |
| Average Crystal Spar Terrace | | 20 | -0 | 13 | - 22 | -21 109 | 46 | 442 | - 0 | 50 | -0 | -70 | -46 | 30 | -0 | -0 | , | -0 | - "- | -0 | -0 | -7 | -0 | | 21 | 1789 | | 968 1035 950 950 | 47 34 | 50 37 | 46 33 | -1 | .0 | -1 | .9 | 1.0 | |
| Skyline Terrace | | 20 | 164 22 | 98 | -23 -23 | 109 | -131 | -112 | -63 | -50 | 31 | - 1 | -46 | -45 | -29 | -8 | | 19 | -1 | 10 | -9 | -14 | -22 -22 | -5 | -0 | 1767 | | 1000 1125 | | 47 | 45 | | 1.0 | .r | 1.0 | 1.0 | -:- |
| The Avalan | | 111 | -11 | 58 | -23 | -4 | -200 | -112 | -22 | 42 | 31 | -46 | 34 | -45 | -4 | | 27 | -24 | -3 | 10 | -0 | -14 | 28 | -5 | -9 | 1800 | | 1050 1050 | | 45 | 45 | | 7.0 | 1.0 | -1 | 1.0 | 1.0 |
| Hampton Place | | 52 | -248 | 41 | -23 | - 3 | -131 | 00 | -22 | 92 | -3 | 47 | -46 | 30 | 24 | -0 | -6 | -31 | | 10 | 24 | | 28 | -6 | -9 | 2036 | | 1036 1036 | | 45 | 45 | | 7 | 7 | .3 | 2 | 1.0 |
| El Darada | | 29 | -411 | 145 | -23 | -187 | 46 | ** | 20 | -50 | 31 | 17 | 34 | -7 | -4 | | -6 | | - 1 | -3 | -0 | -0 | 44 | -79 | -9 | 2200 | | 1123 1123 | | 64 | 64 | | .1 | 7 | 1.0 | -1 | 1.0 |
| North Park Aptr (G) | | 31 | -180 | 15 | -23 | -101 | -131 | -442 | -22 | 42 | 31 | 47 | | 30 | -20 | | -4 | | - 4 | 10 | -0 | ž | -22 | í | -9 | 1968 | | 1014 1014 | 45 | 45 | 45 | - | 7 | .7 | .7 | .5 | |
| Architano | | 27 | -278 | -103 | -23 | -117 | 46 | 20 | 62 | -50 | 31 | -49 | -46 | 30 | -29 | -0 | 27 | -;- | -4 | -3 | -9 | ě. | -22 | - | 21 | 2067 | 916 | 916 916 | 57 | 59 | 56 | | 1.0 | 1.0 | 1.0 | 7 | 1.0 |
| Belmant Terrace | | 131 | -78 | 118 | -23 | -291 | 46 | -112 | 62 | -58 | -69 | 51 | -46 | -7 | 46 | -8 | -23 | -6 | -1 | 10 | -9 | -8 | -22 | 5 | -9 | 1867 | | 1100 1100 | 74 | 81 | 71 | | 1.0 | .5 | 1.0 | .5 | |
| Chorapoako Paint | | 47 | -478 | 111 | -23 | -111 | 46 | 88 | 62 | -58 | 31 | -16 | -46 | -45 | 21 | -8 | 27 | -31 | -1 | -30 | -9 | | 28 | -5 | -9 | 2267 | 1094 | 1094 1094 | | 57 | 56 | | 1.0 | 1.0 | 1.0 | | 1.0 |
| Lantorn Cavo | -4 | 95 | -678 | 29 | -23 | -134 | 46 | 22 | 62 | -52 | 31 | 17 | 2 | 5 | 21 | -8 | 27 | 2 | -1 | 10 | 11 | 21 | 11 | 5 | 11 | 2467 | 1026 | 1026 1026 | | 62 | 57 | - | 1.0 | 1.0 | 1.0 | .7 | 1.0 |
| Crookride | -6.0 | 95 | -278 | -233 | -23 | -74 | 46 | 21 | -22 | 92 | -69 | -49 | | -45 | -29 | -8 | -6 | 2 | -1 | 10 | -9 | 6 | -22 | -5 | -9 | 2067 | 808 | 808 808 | 53 | 54 | 52 | | .7 | .7 | 1.0 | .7 | .7 |
| Villa Serena | | 14 | -145 | 149 | -373 | -111 | 46 | 88 | -188 | -58 | -69 | -49 | 8 | -45 | -29 | -8 | -6 | 2 | -1 | 10 | -9 | 9 | -22 | -5 | -9 | 1933 | 1126 | 1126 1126 | 56 | 57 | 56 | -1.0 | - | .7 | 1.0 | .7 | 1.0 |
| Bristal Commons | -8 | 40 | -378 | 118 | -23 | -427 | 46 | 88 | -22 | -58 | -19 | -49 | -46 | -45 | -29 | -8 | -6 | 2 | -1 | 10 | -9 | 18 | 11 | -5 | -9 | 2167 | | 1100 1100 | 88 | 98 | 83 | - | .7 | .7 | 1.0 | .7 | 1.0 |

Summary: Ways to use MODA for Personal Decisions



- FreezePanes and color coding helps you make sense of data.
- Juxtaposing scores with supporting data helps pressure-test scores.
- Comparing pairs of options helps you pressure-test weights.
- Drill-down sheets handle important sub-issues in an orderly way.
- Using border-row summations and index/match lookups makes spreadsheet evolution straightforward.