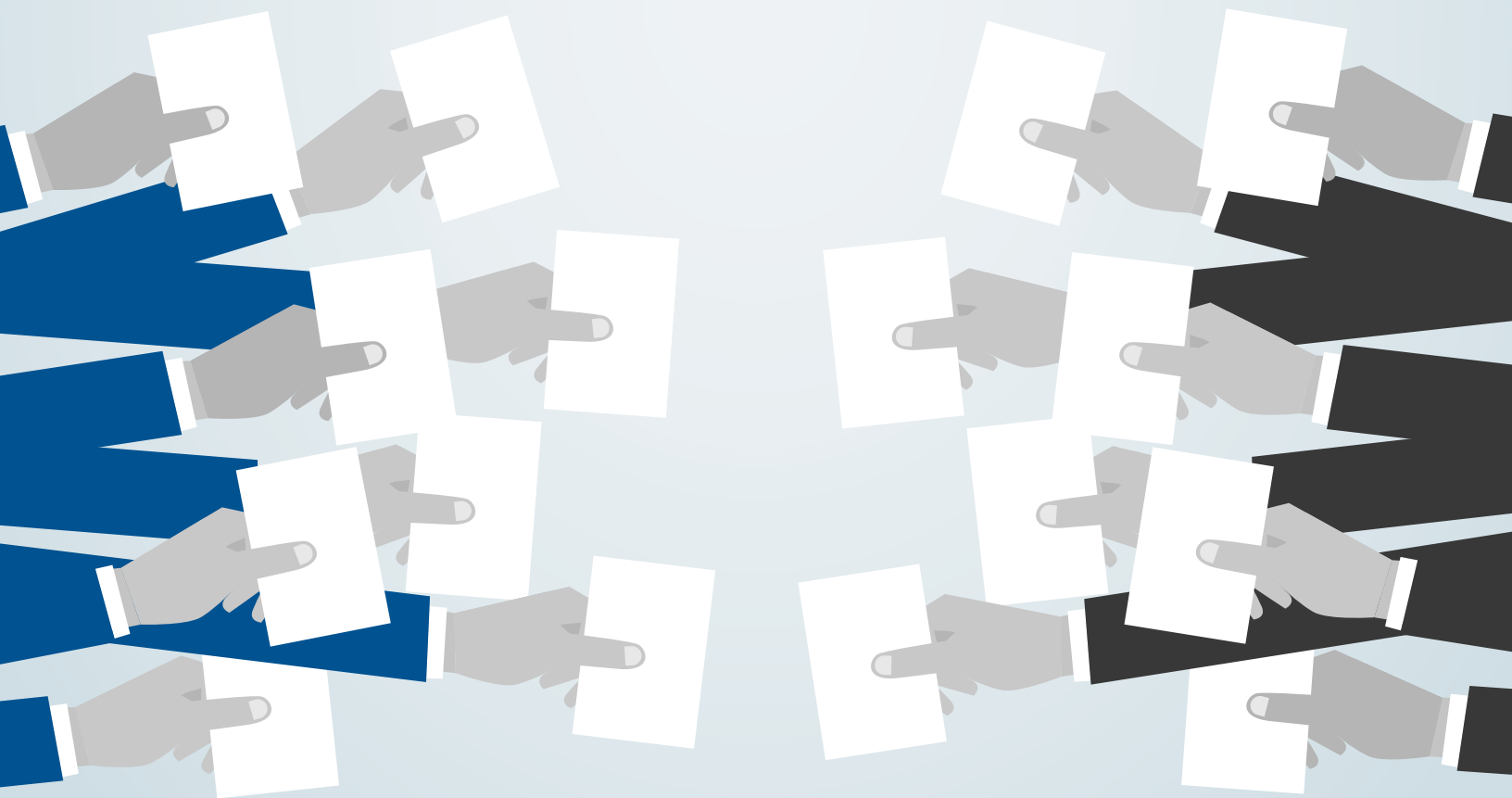RETHINKING BUDGETING

MANY CHOICES AND MANY PEOPLE

Navigating a Crowded Decision-Making Environment with Quadratic Voting and How the Metropolitan Government of Nashville and Davidson County Did It

About the Authors:

- **Matt Prewitt**, President, RadicalXChange Foundation
- **Alex Randaccio**, Technical Director, RadicalXChange Foundation
- **Shayne C. Kavanagh**, Senior Manager of Research, GFOA

We would like to acknowledge the following people for their contributions to the paper:

- **Burkley Allen**, Council Member At-Large, Metropolitan Government of Nashville and Davidson County, Tennessee
- **Talia Lomax O'dneal**, Deputy Finance Director, Metropolitan Government of Nashville and Davidson County, Tennessee
- **Scott Huizenga**, Assistant City Manager, City of Fair Oaks Ranch, Texas
- **Katie Ludwig**, Director of Resource Development, GFOA
- **Chris Williams**, Consultant, GFOA
- **Kyle Wedberg**, Senior Manager, GFOA

About GFOA:

The Government Finance Officers Association (GFOA) represents over 21,000 public finance officers throughout the United States and Canada. GFOA's mission is to advance excellence in government finance. GFOA views its role as a resource, educator, facilitator, and advocate for both its members and the governments they serve and provides best practice guidance, leadership, professional development, resources and tools, networking opportunities, award programs, and advisory services.

ABOUT THE RETHINKING BUDGETING PROJECT

Local governments have long relied on incremental, line item budgeting where last year's budget becomes next year's budget with changes around the margin. Though this form of budgeting has its advantages and can be useful under circumstances of stability, it also has important disadvantages. The primary disadvantage is that it causes local governments to be slow to adapt to changing conditions. The premise of the "Rethinking Budgeting" initiative is that the public finance profession has an opportunity to update local government budgeting practices to take advantage of new ways of thinking, new technologies, and to better meet the changing needs of communities. The Rethinking Budgeting initiative will raise new and interesting ideas like those featured in this paper and will produce guidance for state and local policy makers on how to local government budget systems can be adapted to today's needs. We hope the ideas presented in this paper will spur conversation about the possibilities for rethinking budgeting. The Rethinking Budgeting initiative is a collaborative effort between the Government Finance Officers Association (GFOA) and International City/County Management Association (ICMA).

To learn more, visit **gfoa.org/rethinking-budgeting**.
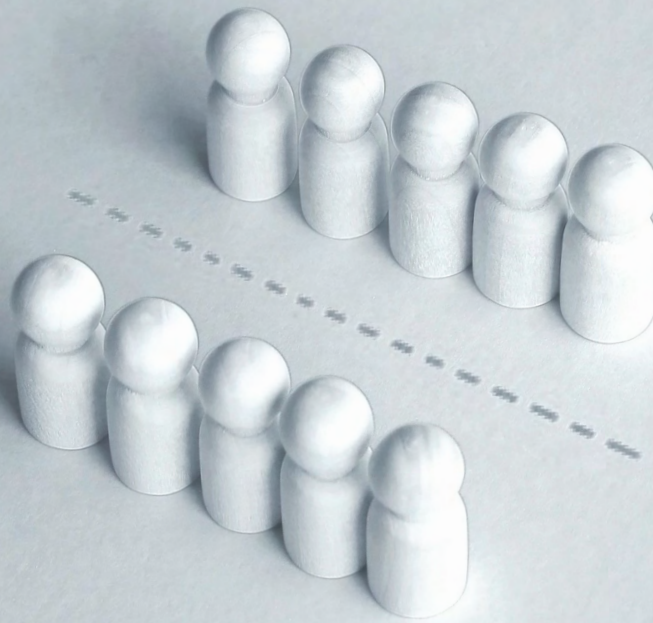
Budget decisions today are often made in an environment of high conflict and low trust. This is not surprising given that conflict is up, and trust is down in the United States, generally. The share of people who think that most other people can be trusted has declined in the U.S. by about one-quarter over the past few decades.[1] This has real consequences. Seven in ten Americans think low trust between fellow citizens makes it harder to solve problems.[2] The good news is that there is a desire to repair this problem. Six in ten Americans think it is "very important" that the level of confidence people have in their fellow citizens be improved.[3]

There are many causes of the decline in trust. One cause with salience to local government is the state of the institutions in which our democratic discourse takes place. Many institutions have not evolved and adapted with the times. For example, the simple "majority rule" vote system has been at the center of American government since the founding of the republic.[4] However, the majority rule voting system can create a polarizing, conflict-inducing dynamic. This is especially true when complex, controversial issues, *like local governments are increasingly required to deal with*, are oversimplified into a binary choice. This is often the case in a local referendum but is also often true in votes undertaken by elected representatives—such as when they vote yes or no on budget proposals. The traditional majority rule system forces people to pick a side and discourages them from investigating potential areas of compromise.[5] The result is that the system (e.g., government) loses legitimacy in the eyes of those who lose the vote. It also misses an opportunity to learn more about the range of preferences that participants have because their choices are reduced to a small number of options (e.g., yes or no).

Local governments are the true laboratories of democracy, making them the ideal place to experiment with new institutional forms designed to address these problems.[6] In this paper, we propose the use of an alternative voting system called "Quadratic Voting" (QV). We will show how QV can outperform traditional voting systems and how it can be applied to budgeting decisions using the Metropolitan Government of Nashville and Davidson County, Tennessee, as a case study. In budgets, there will almost always be more proposals for how to use a local government's resources than there are resources available. Thus, there is high potential for conflict and, thus, high potential for decision-making systems that help manage conflict.

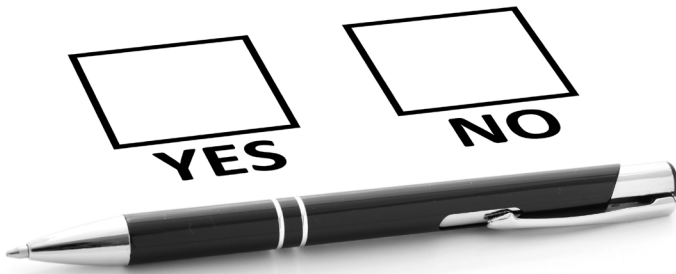# Quadratic Voting Versus Traditional Voting Systems

Let's start by digging deeper into the shortcomings of traditional voting systems. This will help us appreciate the need for QV. In traditional voting systems—sometimes called "one person one vote" (1p1v)—participants are only able to express the *direction* of their preference for a ballot item (i.e., yes/no). There is no way for participants to express the *magnitude* of their preference (i.e., they are not able to express how strongly they feel about any issue). This lack of nuance has consequences. To illustrate, let's consider a few familiar 1p1v scenarios.

Tyranny of the majority. Oftentimes, a decision-making body must consider a proposal that is important to a specific group of people. For example, residents of a minority neighborhood might want a new park. However, the elected representative for that neighborhood might have difficulty getting support for the proposal from a majority of elected representatives, no matter how badly the residents of that neighborhood want the park. Many council members may vote for other uses of funds. Even if the other council members are not opposed to the new park, a lack of enthusiasm could doom the proposal to failure in a competition for resources.

Squeaky wheel. 1p1v systems can face the opposite problem in which passionate minorities dominate the decision-making process. Because the voting system does not allow them to express the magnitude of their preference, the minority finds other ways to do so, like filibustering the deliberation process. Being the loudest voice in the room imposes a cost on the rest of the group; no one else can express themselves while someone is shouting.

Polarization. 1p1v systems create a zero-sum game when groups of people disagree. Decisions are structured around winning and losing in battles staged by the agenda-setter, rather than identifying areas of consensus and building compromise. In this atmosphere, there is almost always some group that feels like its voices were not heard. This occurs in local government budget discussions in which groups are pitted against each other in a win-lose competition for resources.

In democracy and budgets, everyone can't always get what they want. But we *can* make the discourse healthier and more efficient by allowing participants to swing the decisions they care about the most, in exchange for giving up some influence over decisions they care about less. We can capture nuanced data about people's preferences and surface compromises that 1p1v fails to realize. We can do this with Quadratic Voting.

The traditional majority rule system forces people to pick a side and discourages them from investigating potential areas of compromise.

RETHINKING BUDGETING

Quadratic Voting (QV) is an alternative voting system that provides nuanced information about people's preferences. Participants in QV can express the magnitude of their preferences, giving them greater influence over the issues they care about the most. QV ballots contain several issues, options, or proposals on the ballot. Rather than respond "yes" or "no" to each proposal, participants allocate a fixed budget of "voice credits" across the various proposals to express their preferences. For example, a council member might be given 100 voice credits to express their preferences between 60 budget proposals.[7] Casting one vote in favor of a certain proposal costs one voice credit. However, two votes for that proposal cost four credits, three votes cost nine credits, and so on (see Exhibit 1).

EXHIBIT 1 | **QUADRATIC VOTING: CONVERTING VOICE CREDITS INTO VOTES FOR A GIVEN PROPOSAL**
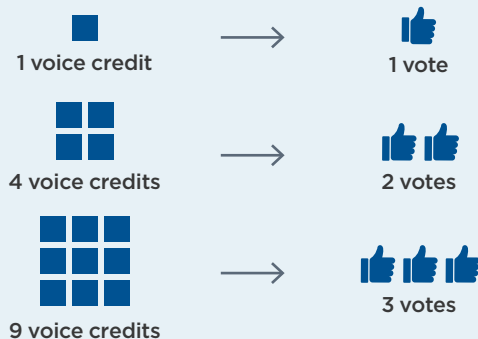
1 voice credit → 1 vote

4 voice credits → 2 votes

9 voice credits → 3 votes
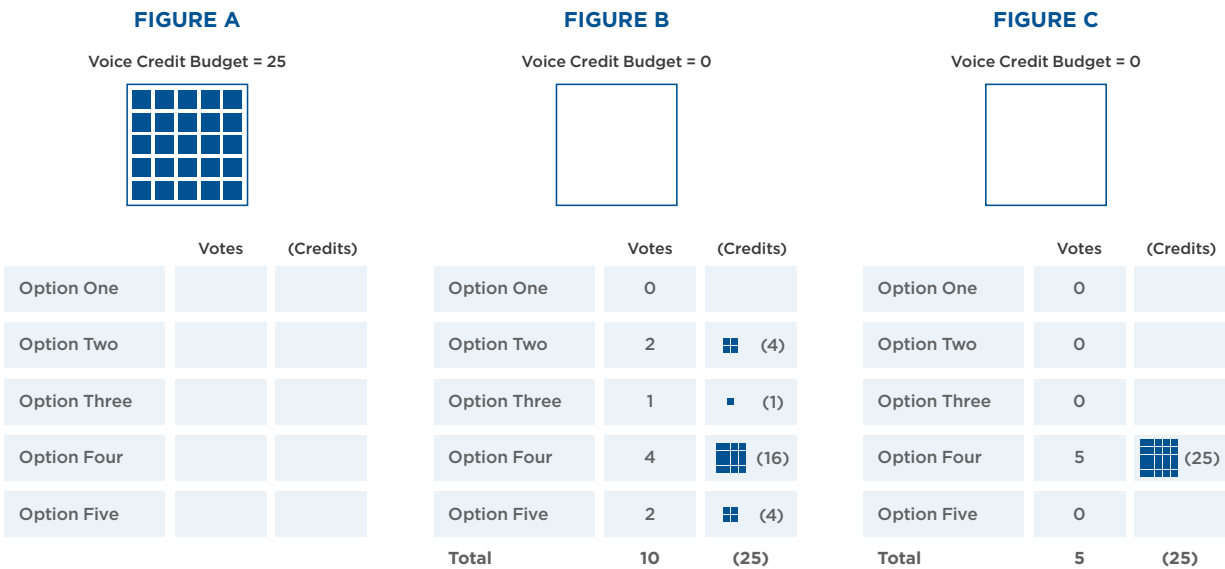
Each participant is given a budget of "voice credits." Voice credits an be converted into votes. Participants can vote more than one for a given proposal, but it costs increasingly more credits for each vote for the same proposal.

Thus, participants could allocate more than one vote to their favorite proposals, but doing so costs them an increasing number of voice credits: The number of voice credits required is the square of the number of votes. The increasing "cost" of voting more than once for the same proposal discourages people from devoting all their points toward their favorite proposal. This and other features of QV allow us to address the limitations of 1p1v that we described earlier:

→ **Tyranny of the majority.** From our earlier example, the council member representing the minority neighborhood could devote most or all of their voice credits to the park proposal, which would allow the proposal to fare better than it would under 1p1v.

→ **Squeaky wheel.** A passionate minority can express their strong preferences, perhaps reducing their need to disrupt the decision-making process in other ways (e.g., filibustering). At the same time, QV forces them to internalize the cost that their strong preferences impose on the group. The increasing cost of casting votes for a single proposal prevents a minority from wielding too much influence relative to their numbers. Concentrating voice credits on one proposal will have limited impact without some support from the rest of the participants.

→ **Polarization.** The increasing cost of casting votes for a single proposal encourages participants to spread their voice credits among different proposals. This helps reveal participants' true range of preferences. If decision-makers know the true range of preferences, it is possible to identify solutions that have the broadest support among all participants. Put another way, it is possible to go from: A) an outcome where one side is happy with the decision and the other side is unhappy to B) an outcome where most or all people are satisfied or at least can live with the decision.

Let's see how QV works in Exhibit 2. Figure A shows a blank QV ballot along with the total number of voice credits that a participant will have access to (Figure A shows 25 credits). Figure B shows a ballot casting one vote for option three, two votes each for options two and five, and four votes for option four. Figure B also shows the number of voice credits it costs to buy each vote. You will notice that our participant gets nine total votes by spending all 25 voice credits as depicted in Figure B. Figure C shows a ballot casting five votes for option four, which costs all 25 voice credits. Notice that the voter in Figure B got more overall say in the decision compared to the voter in Figure C (nine votes versus five votes) by concentrating votes a bit less. This is how QV discourages the most extreme positions.

EXHIBIT 2 | **HOW QUADRATIC VOTING WORKS**

FIGURE A			FIGURE B			FIGURE C		
Voice Credit Budget = 25			Voice Credit Budget = 0			Voice Credit Budget = 0		
	Votes	(Credits)		Votes	(Credits)		Votes	(Credits)
Option One			Option One	0		Option One	0	
Option Two			Option Two	2	(4)	Option Two	0	
Option Three			Option Three	1	(1)	Option Three	0	
Option Four			Option Four	4	(16)	Option Four	5	(25)
Option Five			Option Five	2	(4)	Option Five	0	
			Total	10	(25)	Total	5	(25)

We've seen how QV works in theory. Later in this paper, we will see how it worked in the Metropolitan Government of Nashville and Davidson County. Before we get to Nashville, though, we will address another question that might loom in the minds of local officials: complexity. 1p1v is a more straightforward system than QV. QV might have theoretical advantages, but might those be outweighed by the practicalities of implementation? Part of the answer comes from information technology. When our democratic institutions were first developed, a secret paper ballot was considered "cutting edge." Today, information technology interfaces can automate the mathematics behind QV and provide cues and feedback to the participants to help them participate in QV. For years, the government of Taiwan has used sophisticated tools like QV and other technologies that facilitate group decision-making at a large scale (potentially thousands of people) to augment public decision-making, making them a leader in democratic innovation. We can do it too.

We should consider how other, less complex, alternative voting systems compare to QV. QV has important advantages over other alternative voting systems, which may justify the added complexity. For example, in Ranked Choice Voting (RCV), participants can rank the proposals in order of their preference. QV captures the order of participants' preferences but also captures the relative strength of preferences. For example, QV will show the difference between a voter who supports their first and second choice nearly equally and a voter who strongly prefers their first choice, whereas RCV will treat these voters identically. Knowing the strength of preferences is critical for solving the tyranny of the majority and polarization problems we described earlier.

Another alternative voting system many local governments have used is "dotmocracy," where individuals are given "dots" (or points) to allocate to as many or as few options as they like. This is often experienced as "sticky dot" voting, where participants are given colored dots with adhesive backing (stickers). The available proposals are arrayed on a bulletin board, and participants place their stickers next to their preferred options. This is like QV's "voice credits," except that one dot translates into one vote in all cases. There is no increased cost to voting more often for a single proposal. This means that dotmocracy experiences a version of the "squeaky wheel" problem, where people with strong preferences for a given option can dominate the voting by devoting all their dots to their top choice.[8] QV avoids this problem by imposing an increasing cost on loud voices, encouraging participants to provide an honest representation of their preferences and identify possible compromises.

We've seen the advantages that QV has over other voting systems. Now let's see how QV played out in a Metropolitan Government of Nashville and Davidson County Council budget hearing.

The Case of Nashville

In the pilot of QV in Nashville, Burkley Allen, chair of the Finance Committee of Nashville's Metropolitan Council, proposed a budget that revised the mayor's proposed budget based on public input and the will of the council. Traditionally, the council members submitted proposed amendments and then advocated for the items they care about the most. However, the council members could not provide more comprehensive information on their views about the other budget proposals under consideration. There was not enough time in committee or council meetings to have a comprehensive discussion about all options and hear from all the council members.

Research suggests that seven people is about the maximum size for a group to deliberate effectively. Further, the formal rules, procedures, and scrutiny that go along with a public meeting can impede effective conversation. Nashville's Metro Council has many more than seven people[9] and is subject to the same rules and scrutiny as any other local government-elected body. Hence, under normal time constraints, it can be impossible to reach a nuanced understanding of the council's preferences through traditional discussion and debate. In previous years, the council had tried "dotmocracy" on some budget items. Each council member was given 100 dots and asked to use the dots to express how strongly they supported each proposal. However, the council experienced the "squeaky wheel" problem we described earlier: Members tended to place all their dots on their top choice, leaving the budget chair in the same situation as before. Allen felt that without more nuanced information about members' preferences, her proposal would be unlikely to be representative of the council's will—so when she heard about QV through the GFOA, she convinced her colleagues to give it a try for the 2023 budget.

When presented with the option of QV, Chair Allen considered it a viable option to better gather the information she needed—not only members' top choices but also a ranked list of their priorities.

After completing the long process of discussing and refining the proposed spending options, council members received a 10-minute briefing on QV, then participated in an informal deliberative poll. Each council member was able to express their preferences across the 57 final options before the end of the evening using an online Quadratic Voting tool developed by RadicalxChange. Allen had the results that same night, which were recorded publicly. Thanks to QV, the council had a much clearer understanding of what members' priorities were—a crucial aid in what tends to be a lengthy and unsatisfying process.

Is Quadratic Voting a Binding "Vote"?

In Nashville, QV was not a binding vote as a formal council action would be. Instead, QV was a tool for facilitating and clarifying conversation, much like the "dotmocracy" exercise that the council had tried earlier.

Participants enjoyed QV and requested it to be used again. Council member Brett Withers stated:[10] "Really pleased to see these results. I think the Quadratic Voting was very helpful. It helps to provide some objective measurements for what is otherwise a pretty subjective process...so I wanted to applaud [Chair Allen] for bringing it forward." Allen's budget recommendations, delivered the next day, followed the QV results. She noted that the results were largely in line with her expectations, but that having such a clear link between the QV results and her recommendations helped create a better sense of legitimacy and participation. The real measure of the value of QV for Nashville is if the council plans to use it again. And not only does Allen recommend repeating QV for the operating budget proposal next year, but she is also suggesting expanding the use of QV to other decisions, like capital projects.

Conclusion and Next Steps

QV represents an opportunity for local governments to evolve how decisions are made. As the Nashville example illustrated, QV holds the potential for improving budgeting decisions by:

→ Providing a more complete picture of the participants' preferences.

→ Accommodating a diverse range and many participants.

→ Facilitating better decisions more quickly than conventional discussion and debate, especially where many people and/or many choices are involved.

QV will be most useful when there are large numbers of people who need to be part of the decision-making process and where high-quality deliberation about the decision is difficult or impractical (i.e., too many choices, too many people). If you would like to try QV in your local government, it's simple. You can explore the **free software tool** to get a feel for how it works. RadicalxChange Foundation is available to support and advise pro bono on how to structure decisions and explain the process to participants. Reach out through GFOA or **info@radicalxchange.org** to learn more.

RETHINKING BUDGETING

ENDNOTES

[1] Interpersonal trust in the United States, 1972 to 2018. *Our World in Data.* https://ourworldindata.org/grapher/interpersonal-trust-in-the-us

[2] Trust and distrust in America: 2. The state of personal trust. (2019). *Pew Research Center.* https://www.pewresearch.org/politics/2019/07/22/the-state-of-personal-trust

[3] Ibid.

[4] Though the structure of the U.S. government does have systems designed to guard against the "tyranny of the majority," majority rule as determined by win-lose voting is firmly at the center. For example, votes in the U.S. Congress and Supreme Court decisions proceed in this manner.

[5] Ripley, A. (2021). *High conflict: Why we get trapped and how we get out.* Simon and Schuster.

[6] This is an idea expressed by observers of the American systems of government, such as Alexis de Tocqueville and Thomas Jefferson.

[7] All council members would be given the same number of starting credits.

[8] We should note that dotmocracy can alleviate the tyranny of the majority problem, so it does have strengths. The flip side is that it can accentuate the squeaky wheel problem.
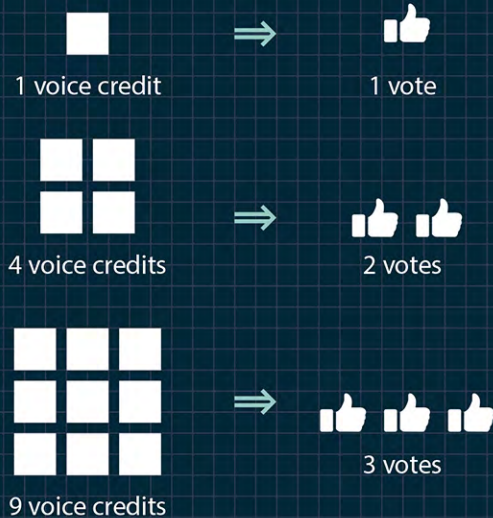
[9] Nashville has a total of 40 council members, making it the third-largest city council in the U.S.

[10] Quoted from the Metro Council public meeting where QV was used, which took place on June 13, 2022.

QUADRATIC VOTING

Budget decisions today are often made in an environment of high conflict and low trust. This is not surprising given that conflict is up, and trust is down in the United States, generally. In democracy and budgets, everyone can't always get what they want. The traditional majority rule system forces people to pick a side and discourages them from investigating potential areas of compromise. But we can make the discourse about budgeting healthier and more efficient by allowing participants to swing the decisions they care about the most, in exchange for giving up some influence over decisions they care about less. We can do this with Quadratic Voting (QV).

HOW IT WORKS:

Converting voice credits into votes for a given proposal.

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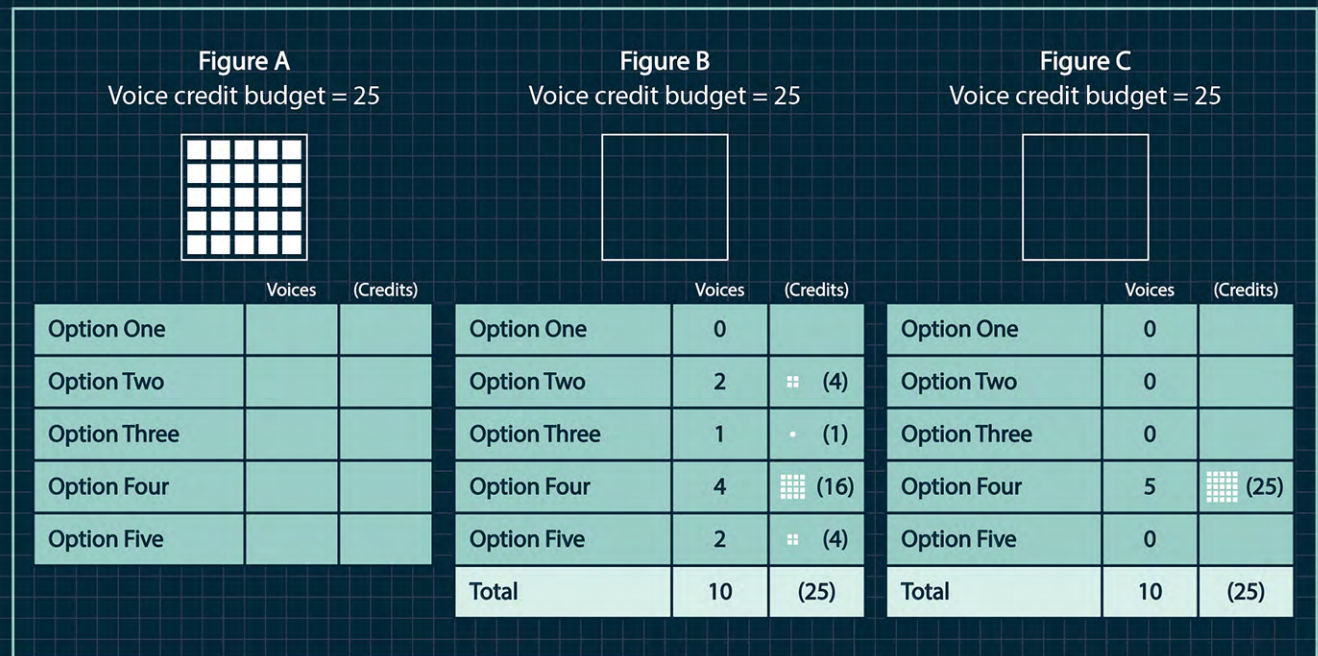
4 voice credits ⇒ 2 votes

9 voice credits ⇒ 3 votes

Each participant is given a budget of "voice credits." Voice credits an be converted into votes. Participants can vote more than once for a given proposal, but it costs increasingly more credits for each vote for the same proposal. This is how QV discourages the most extreme positions.

Figure A shows a blank QV ballot along with the total number of voice credits that a participant will have access to (Figure A shows 25 credits). Figure B shows a ballot casting one vote for option three, two votes each for options two and five, and four votes for option four. Figure B also shows the number of voice credits it costs to buy each vote. Figure C shows a ballot casting five votes for option four, which costs all 25 voice credits.

Figure A
Voice credit budget = 25

	Voices	(Credits)
Option One		
Option Two		
Option Three		
Option Four		
Option Five		

Figure B
Voice credit budget = 25

	Voices	(Credits)
Option One	0	
Option Two	2	(4)
Option Three	1	(1)
Option Four	4	(16)
Option Five	2	(4)
Total	10	(25)

Figure C
Voice credit budget = 25

	Voices	(Credits)
Option One	0	
Option Two	0	
Option Three	0	
Option Four	5	(25)
Option Five	0	
Total	10	(25)

COMPLEX MATH ON THE BALLET?

A question that might loom in the minds of local officials regards complexity. One person one vote (1p1v) is a more straightforward system than QV. Part of the answer comes from information technology. When our democratic institutions were first developed, a secret paper ballot was considered "cutting edge." Today, information technology interfaces can automate the mathematics behind QV and provide cues and feedback to the participants to help them participate in QV.

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Government Finance Officers Association
203 N. LaSalle Street, Suite 2700
Chicago, IL 60601
312-977-9700 | gfoa.org