

Consumer use of and preferences for assistive communication technology in public places

Committee for Communication Access in America - 8 January, 2024: Stephen O. Frazier, Chair; Abram Bailey, AuD; Blake Cadwell; Carol Clifford, AuD; Kevin Liebe, AuD; David Myers, PhD; Juliette Sterkens, AuD.

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Abstract

Background – Since the passage of the Americans with Disabilities Act (ADA), assistive listening systems (ALS) have been mandated in many public gathering places. Various forms of captions, though not mandated, are requested and sometimes provided.

Purpose - The survey's intent was to acquire accurate information on the preferences and use habits of hard of hearing people when utilizing assistive communication systems. That information will enable providers of services to people with hearing issues to inform clients of the benefits of the various assistive technologies.

Research Design – The survey was a retrospective cross-sectional study of individuals with hearing loss or an auditory processing disorder. Many questions were cross-tabbed to get an accurate picture of various subgroups.

Study Sample - 1519 individuals with self-reported hearing loss or other hearing related conditions volunteered to participate anonymously in the survey.

Data Collection and Analysis - Data was collected and analyzed by the Frost Center for Data and Social Research at Hope College in Holland, MI using the Qualtrics platform.

Results - If only one technology was to be available, the first choice of respondents was CART or captions, with hearing loops the preferred assistive listening solution. Action by venues to address the various complaints about the assistive communication systems they provide could increase their utilization.

Asked how often they find such accommodations, 62% said seldom or never.

Millions of people with hearing loss regularly use assistive listening systems and captions in some form when attending theatrical productions, worship services, meetings, or in other places of assembly in order to fully participate in the proceedings. Millions more do not. Why is that?

To answer this question, the Committee for Communication Access in America was formed. Seven prominent advocates for people with hearing loss came together to explore, document and quantify assistive communication technology use. This report makes available the reliable, detailed information needed to make informed decisions about the provision of assistive such technology to the hard of hearing public.

There's a wealth of material on the various assistive communication technologies available - how they work, how they differ, even how they should be installed. For example, the US Access Board did an extensive and very useful study¹ and report on assistive listening systems (ALS). The recently dissolved Collaborative for Communication Access via Captioning (CCAC) did a survey² on the myriad benefits of captioning to its users. What neither survey nor the other literature really addressed, though, is

1 Large Area Assistive Listening Systems <https://www.access-board.gov/research/communication/assistive-listening-systems/background/>

2 The proven benefits of real-time captioning should be available to all (The benefits of captioning | David H. Kirkwood | Lauren E. Storck | hearinghealthmatters.org/hearingviews/)

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what factors enter into the decision to not use systems when they are in place and in operation. This report makes the survey findings available to the various stakeholders – hearing care professionals, providers of services to and products for people with hearing loss, and the hard of hearing public – to help all of them better understand when, where, why and how hard of hearing people use the assistive technology in question and why it is often not used.

Research Design

The survey was a retrospective cross-sectional study of individuals with hearing loss or an auditory processing disorder.

Study Sample

1519 individuals with self-reported hearing loss or other hearing related conditions volunteered to participate anonymously in the survey. The opportunity to do so was presented on numerous websites, in newsletters, blogs, listservs and via email by Hearing Tracker, the Hearing Health Foundation, Living with Hearing Loss, Healthy Hearing, Soundly and many others.

Data Collection and Analysis

Data was collected and analyzed by the Frost Center for Data and Social Research at Hope College in Holland, MI using the Qualtrics platform. In this retrospective study, aural and visual consumer use and preferences of assistive communication technology was evaluated through the use of multiple-choice questions with an occasional question also inviting short essay type answers. Many questions were cross-tabbed to provide the ability to compare and assess responses between subgroups.

It should be noted that, in some instances, the percentages cited in this report may differ from those in the tables prepared by the Frost Center that are posted at www.ccaa.name. Because participants were asked to answer all questions, they were offered the optional “not applicable” (or some similar response) as their answer on some questions. The tables prepared by the Frost Center included that figure in determining statistics thus, in question 20 in the survey, 27.58% of respondents provided that response, diminishing the percentage offering one of the five informational responses to the question about borrowing assistive listening equipment. With the “not applicable” responses removed there were 961 respondents who answered the question instead of 1327. This raised the percentage who replied “always” from 14.24% to 19.66% with other percentages similarly affected. Another example is question 9 where, if just the yes/no responses are considered, 95.9% responded yes instead of 85.78% and 4.1% said no instead of 3.64% plus 8.22% not sure.

Purpose

The survey's intent was to acquire accurate information on the preferences and use habits of hard of hearing people when utilizing assistive communication systems in large public venues. That information will enable providers of services to people with hearing issues to inform clients of the benefits of the various assistive technologies.

Hearing Loss History

Gender and age were among the many factors involved with ALS (assistive listening system) use. Women outnumbered men by a ratio of nearly two to one in taking the survey and, though 65% of people in the US

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with hearing loss are below the age of 65, seniors represented nearly 80% of the survey respondents. The majority of participants had been wearing hearing aids or an implant for over 11 years and 44% had done so for over 21 years. 42% percent were affiliated with an organized hearing loss support group of some sort with the Hearing Loss Association of America (HLAA) garnering the top spot with over 75% being either a local or national (or both) member. Many listed ALDA (Association of Late Deafened Adults) and many Say What Clubs were represented. Some listed social media groups and others were members of local groups like Tucson's Aloha (Adult Loss of Hearing Association) or the group affiliated with the Shedd Institute in Eugene, OR.

While only 11% of the hard of hearing are reported by experts at Hearing Review⁴ to have a severe to profound loss, in this survey they represented 66% percent of all participants, possibly indicating the importance people with high degrees of hearing loss place on these systems. Only 9% of participants reported a mild hearing loss with 25% reporting their loss to be moderate. The cross tabbing of many questions made it possible to compare the responses from the other subgroups with the statistical majority - people with severe to profound hearing loss.

12% of respondents were relatively new to wearing hearing aids, having done so for less than 5 years with the largest contingent, those having used hearing aids or implants for over 21 years, representing 44% of all respondents. 4.4% were hard of hearing but did not use hearing aids at all and a few, surprisingly, were in the "profound" group.

Hearing Devices

96% of respondents reported having hearing devices of some sort with the vast majority, 80%, reporting them to be hearing aids that were prescribed by a hearing care professional. These were not necessarily all people who have a severe to profound hearing loss. 89% of those with a moderate loss had prescription devices

What sort of hearing device do you currently use?	RAW All	BY AGE GROUP					BY DEGREE OF LOSS			
		Under 30	30 to 45	46 to 60	61 to 75	Over 75	Mild	Moderate	Severe	Profound
Prescription hearing aids	80	77	79	75	79	83	75	89	97	54
Cochlear implant	22	23	16	24	22	23	<1	2	11	59
Bone anchored implant	1	0	1	2	<1	<1	<1	<1	<1	<1
Hearing aids purchased online	2	0	0	2	2	2	1	3	1	<1
OTC hearing aids or PSAP	2	0	4	4	2	2	7	4	2	<1
None	4	5	9	5	4	3	17	5	<1	2

Percent of respondents in total group plus cross-tabbed in sub groups. Figures may add up to more than 100% because some have implant plus hearing aid, or less or more than 100% from rounding to nearest whole number.

Table 1

and 75% with just a mild loss had invested in prescription hearing aids. Table 1 shows the differences in the breakdown both by age group and by the degree of hearing loss. With a whole year having passed since introduction of over-the-counter (OTC) hearing aids, the scant 2% of respondents who either had OTC aids or a PSAP (personal sound amplification product) indicates this new class of hearing aids has been slow in attracting buyers.

Nearly 23% of the respondents had either a cochlear or bone anchored implant, a percentage much higher than the .6% of the hard of hearing who have cochlear implants (CIs) using the statistics offered by the NIDCD in their Quick Statistics About Hearing.⁵ This was another example of the heavy reliance that people with a

³ 17 Misconceptions About People with Hearing Loss (<https://betterhearing.org/newsroom/blogs/17-misconceptions-about-people-with-hearing-loss/>)

⁴ [Severe to Profound Hearing Loss: What Do We Know and How Do We Manage It? | The Hearing Review](#)

⁵ Quick Statistics About Hearing (<https://www.nidcd.nih.gov/health/statistics/quick-statistics-hearing>)

serious hearing loss have on the accessibility and availability of assistive communication systems in public venues. Hearing aids purchased online represented less than 2% of the participants. People with a mild loss were the most apt to have OTC hearing aids but there were a few with severe to profound loss who reported using OTC or PSAP devices. Those in the over 75 age group were the most apt to have prescription hearing aids while the largest group with OTC devices was 30 to 45-year-olds.

The survey found that experience, degree of hearing loss, and personally owned hearing devices all played a major role in the decision to use available assistive communication systems. Depending on the type of ALS available, 37 % to 69 % of people with a severe to profound hearing loss reported always using an assistive listening system when available. Respondents with twenty or more years wearing hearing aids were twice as likely to always or usually use an available ALS as were those with no more than five years as a hearing aid wearer.

When answering just “yes” or “no”, in regard to Bluetooth and telecoils, 96% of participants in the survey who offered an opinion reported that the former would be a “must have” for the purchase of hearing aids. In the case of telecoils, the comparable figure was 73%. If just those with severe to profound hearing loss are considered, the percentage jumps to 77% for telecoils. The ability of a remote mic to stream a loop's signal to a user's hearing aids might meet that “must have” requirement but only 18% of respondents who had hearing aids reported having such an optional device.

Which of the following do you have in or with your hearing devices? (Please select all that apply.)	RAW	BY DEGREE OF LOSS			
	ALL	MILD	MODERATE	SEVERE	PROFOUND
Bluetooth capability	83	76	85	86	80
Smartphone compatibility	73	68	76	77	67
Smartphone app	69	67	72	68	68
Disposable batteries	49	34	37	56	54
Removable rechargeable batteries	20	10	4	9	48
Built in rechargeable batteries	40	51	57	40	23
Telecoils/T-switch	52	35	36	54	66
Volume control	87	82	85	89	88
Remote control	39	28	34	29	47
Remote microphone	29	17	19	29	42
Remote microphone with telecoil	18	9	10	18	27
TV listener	30	16	24	33	36
Don't know on some	13	21	17	12	11

Table 2 Percent of respondents who have hearing aids as raw data and in a sub group.

The presence of telecoils in hearing aids and implant processors is included in table 2. It answers the question as to how many hearing aid wearers are actually able to utilize hearing loop systems by simply touching a button on their devices. Overall, 52% of respondents were aware of their devices having telecoils. Adding in those able to connect with a t-coil capable remote mic and 44% of those with a mild loss had this capability compared to 93% for those in the profound category. For the entire group, the average works out to be 70%. Eleven states have enacted legislation that requires some sort of counseling on hearing loop/telecoil technology prior to the fitting and dispensing of hearing aids. In those states, for those who could recall the visit, 47% of respondents

reported having received such counseling prior to the purchase of their current hearing aids. 40% of the residents of states without such a counseling requirement reported having had such a conversation with their provider prior to selecting their current hearing aids, indicating such regulations have some (but not a major) impact on consumer awareness and use of the technology.

Using Assistive Communication Technology

83% of respondents reported having Bluetooth® capability with their devices and it was most often used for talking on the telephone. Streaming sound from an iPad or similar device was the second most heavily used application of this wireless technology followed by listening to podcasts and then watching TV. Respondents with telecoil equipped hearing aids, or telecoil enabled receivers such as some remote mics, represented 70% of all participants and they reported that the devices were most often used to connect to assistive listening systems in places of worship or other gathering places offering hearing loop connectivity. 17% of respondents indicated they have but do not use the telecoils in their hearing aids. 55% of participants listed support groups such as HLAA or ALDA or the Internet as the sources where they learned about telecoils with their hearing care provider noted for 42%. Friends or a family member were a source for 8%. A surprising 17% responded that they knew nothing about telecoils until they took the survey, attesting to the lack of adequate counseling and, possibly, the ineffectiveness of counseling mandates in states that have such a regulation.

What type of system or accommodation do you most commonly find to be available? (Please select all that apply.)	
Percent	Technology Found
21	FM with receivers and headsets or earbuds
15	FM with receivers and earbuds or headsets and neckloops
5	IR with receivers and earbuds or headsets
4	IR with receivers and earbuds or headsets and neckloops
17	Hearing loop with receivers and earbuds or headsets
8	Other (audio WiFi, hard wired with headsets etc.)
19	CART - open captioning
29	Captioning with hand-held device loaned by the venue or a personal smartphone with an app
36	I'm not sure what type some of the systems are

Table 3

The availability of an ALS or captions in a venue has increased dramatically in the years since the former were mandated by the ADA. 26% of respondents reported that they always look for or request an assistive communication accommodation when they attend an event in a gathering place where they feel hearing could be problematic. Unfortunately they report that they “always” or “usually” find it only about 15% of the time with 18% reporting they never find it. Though not mandated in places of worship, their services appear to be the single largest providers of such assistive communication help based on the numbers they represent on most community's “looped venues” lists. With audio systems, respondents said they find that the it is most often an FM system with or without neckloops 51% of the time, or a hearing loop 27% of the time. Infrared systems were in place 14% of the time with WiFi and others making up the balance.

WiFi audio systems are currently being promoted as suitable for use in the same settings as the older, established technologies, and 16% of respondents had experienced these systems in such settings as a music hall, a church and a museum. 53% reported finding the latency of the system either distracting or objectionable.

Research⁶ has found that the problem of latency varies with the type of sound with musicians being aware of it with readings of 20 to as little as 3 milliseconds (ms) depending on the sound being vocal, guitar or some other instruments. With spoken words it becomes apparent to some listeners at around 30ms. Most WiFi audio systems currently on the market self-report readings already in the 50 to 80 ms range but network speed and intermediary devices such as smartphones or streamers can cause a small to a substantial increase in that rate. Latency in FM, RF and IR systems falls below those ranges and loops have virtually no latency.

⁶When does audio latency matter and not matter? (<https://music.stackexchange.com/questions/30323/when-does-audio-latency-matter-and-not-matter>)

Keeping in mind that the pool of respondents was heavily weighted toward people with severe to profound hearing loss, 47% of participants reported they avoid going to theater productions, religious services, or other events where they know there is no assistive communication accommodation with another 28% saying they sometimes do. Many respondents took advantage of the opportunity to offer personal comments to this particular question. Among them were a preference for CART or captions over an ALS, difficulty in getting the ALS to work, and how earbuds don't help those with a CI.

For venues that offer an ALS with headsets, only 37% of respondents “always” or “usually” borrow the equipment. That figure only increases by 2% for a venue offering a neckloop in place of the headset but, in a looped venue, 69% of those with telecoils in their hearing aids always use the system and many without telecoils would borrow a receiver and headset just as they would with an FM or IR system, adding to that figure.

Nearly 1,000 of the survey's 1500+ respondents accepted the invitation to offer comments on the problems they have encountered when they sought to use venue provided assistive technology. Some of those problems were reported to occur at the onset of the visit to a facility. Judging only by the number of comments containing certain words, captions were the number one concern respondents wrote about. GalaPro receivers for captions were singled out for comment several times. One respondent reported, “Often, especially in smaller theaters using Gala Pro, sometimes the Gala Pro wifi is not working and often the staff insists it's my phone set up or that no one else has complained about it.”

Though not always offered as a complaint, variations of the word “caption” garnered the most mention with 229 instances. Following was “staff” with 210 mentions followed by various forms of “battery” with 137 and “loop” with 135.

Among the comments submitted by participants were the following examples in no particular order.

- | | |
|---|--|
| Captions too delayed | Staff cannot find devices |
| Staff inadequately trained in use of equipment | Not enough volume available on earphones |
| Batteries dead or died during event | Reading glasses needed for captions |
| Absent, inadequate or no signage | Neckloops don't work |
| Some loops have dead spots or weak signal | Many places don't offer neckloop option |
| Seats were “out of range” for caption glasses | Presenters use mic inconsistently |
| Headset found to be non-hygienic | On/Off switch hard to find |
| Not enough headsets on hand | Latency in system distracting |
| WiFi not working for captioning app | Long wait to return receiver |
| Interference in the signal sent to the receiver | Headset too uncomfortable |
| Quality of sound was not good | Just too much hassle |

With no attribution, all comments for several of the questions are posted at the CCAA website (www.CCAA.name) using the “Survey Results” link on the home page.

Other Communication Technology

Beyond assistive listening systems installed in facilities, 63% of respondents reported the ability to use various means of communicating individually with others when visiting those public venues. Heading the list were speech-to-text smartphone apps used by 40% of them. Bluetooth remote microphones were used by 27%. Though only 3% had a pocket talker, 13% had installed a speech amplifying app in their smartphone. 4% also utilized a personal FM or one-way communication system of some sort.

Results

In the case of visual systems, the survey found there's no mystery regarding their use. Where CART or captions are offered, most people with hearing loss will use them. An overwhelming 70% of respondents answered "yes" when asked if they used captions when they were offered, and 29% reported that they used CART to the exclusion of an ALS if one was present. By degree of hearing loss, 42% with a mild loss report never using CART. As the degree of loss gets up to profound, only 13% are still saying that. 37% reported using both with just over 5% indicating they used the ALS instead of the captions. 61% of respondents offering an opinion said they would recommend that it be CART or captions as opposed to various other technologies if only a single system was to be installed in their city council chamber. A hearing loop, at a low 23%, was the second choice. Though not singled out in the questions, a significant number of participants reported using hand held captioning devices, usually in live or movie theaters, and had problems with their operation. Respondents reported either CART or hand-held captioning devices were available in 40% of the venues they frequented. If this figure was to increase, the utilization of assistive communication technology would likewise increase. As was the case with assistive listening systems, captioning had its share of problems that can impede its use. Those comments from participants are posted at www.ccaa.name. The problem with CART or other forms of captions is that they, unlike an ALS, are not mandated and thus very often not provided.

Where assistive listening systems are concerned, the answer was not that simple. The degree of hearing loss, the type of system available, and the capabilities of the user's hearing aids all play a role in determining whether a system is used or not. Many survey questions were cross-tabbed, establishing subgroups to pinpoint differences in responses based on age, experience and degree of hearing loss. 17% of people with mild hearing loss reported having no hearing devices while only 5% fell into that category if they had a moderate loss. 7% used OTC hearing aids or a PSAP while 75% with just a mild loss have prescription hearing aids. 97% of those with severe loss had prescription devices compared to only 54% with a profound loss. For the latter group, 59% had an implant instead.

Conclusions

The reported lack of assistive communication systems is distressing. Imagine if over 60% of people using wheelchairs were unable to find the ramps needed to enter buildings. While the ADA has improved access for many people with other disabilities, its impact for people with hearing loss has lagged. 62% of the survey respondents indicated that they seldom or never find hearing accommodations in public venues. Further, over 70% of the respondents reported they avoid (or sometimes avoid) going to theater productions, religious services, or other events because of the hearing difficulties they encounter and the lack of assistive communication options. Among other reasons for avoiding attendance were the failure of borrowed equipment, the hassle to check out equipment, or the public 'outing' of their disability.

Great improvements are needed.

The survey findings indicate that the users' preferences affect how often they use assistive technologies. Captions were preferred by 61% of all respondents, particularly by people with severe to profound hearing loss

who may have found that an assistive listening system does not give them as many words as captions. The popularity of captions might also be attributable to people's familiarity with them as captions are readily available on TVs, through apps on personal devices, at movies, and on virtual meeting platforms. Captions increasingly come from automatic speech recognition software but some situations (emergency debriefings, government meetings, legal settings, and medical settings) will still require the accuracy of a live captioner (CART or Communication Access Realtime Translation).

By providing open captions to theater goers, the Shubert Organization's GalaPro system is among captioning technologies being used in a growing number of movie and live theaters across America. Their goal is to make the entertainment industry more accessible to audiences but, from multiple respondent comments and the lower-quality speech clarity of some movie sound tracks⁷, improvement is needed. We encourage the theater industry to address those complaints and meet the needs of people with hearing loss, second language learners, and younger generations (with and without hearing loss) who have expressed a preference for captions.

While almost everyone knows about captions, assistive listening technology is less well known. Too few audiologists recommend hearing loops or telecoils to their patients resulting in many hearing aid users not being aware of and using hearing loops as compared to captions. To increase usage, audiologists and dispensers should provide every patient with information about hearing loop/telecoil technology and recommend hearing aids with telecoils whenever feasible. OTC hearing aid manufacturers should also consider offering telecoils in those devices when feasible. Consumer education is critical if people with hearing loss are to be aware of the many benefits of all types of Assistive Listening Systems with or without a neckloop option.

The ADA requires an ALS in many venues but it may be in disrepair or unadvertised. Simple changes could prevent many issues highlighted in respondent comments. Good advertising of the system, its maintenance, adequate staff training, a good charging protocol, and a simple and trouble-free lending and returning regimen (perhaps even permitting patrons to reserve a device online) could increase utilization of any assistive communication systems. The provision of functioning neckloops and standardized information on the types of assistive technology that is offered on the venue's website, in every playbill, and with inserts in the will-call tickets envelopes should be standard operating procedure. Easily seen signage at all entrances, mention of the assistive system(s) in announcements over the PA at the start of lectures or shows could also increase usage.

For venues without any type of assistive communication technology, the committee recommends consideration of the ease of use and the preferences of consumers when acquiring one. Keeping in mind that the respondent pool for this survey was heavily weighted toward people with severe to profound hearing loss, while captions were the top pick for communication access, (currently) only assistive listening systems meet the requirements of the ADA. Over 60% of the respondents preferred hearing loops when choosing among the five ALS technologies currently available. The survey also confirmed that hearing loops are more likely to be used than FM or IR systems.

For users of assistive communication systems

Consumers should give feedback (good and bad) to management at venues offering assistive systems. This can be done via Google Maps, social media, or by otherwise contacting the venue. They should complain to

⁷ www.insider.com/generation-z-subtitles-closed-captioning-millennials-no-hearing-loss-2023-8#:~:text=Some%20members%20of%20Gen%20Z,and%20listen%2C%22%20Chandler%20said.

management if a venue's systems are lacking or malfunctioning, and be prepared to file a complaint with the Department of Justice at www.ada.gov if the venue takes no action on the complaint. A positive response from the venue should be rewarded with positive commentary.

Getting More People to use assistive communication technology

The key to greater utilization of assistive communication technology is raising awareness of it and its benefits with the hard of hearing public. Hearing care providers and the venues offering such technology are the kingpins in undertaking such a challenge. The old saying that "we don't know what we don't know" exemplifies the current situation. Though in reference to assistive listening, what Sergie Kochkin, PhD wrote in 2007 is equally applicable today⁸. He said, "... hearing aid adoption rates cannot improve appreciably without a corresponding increase in the utility of the device." He had found that when consumers are satisfied with their hearing aids in only a few listening situations, their overall satisfaction is very low, but, if satisfied with their ability to function in many listening situations, their overall satisfaction with the devices is very high. He then surmised that increasing the functionality of hearing aids will result in more positive word-of-mouth which will then lead to greater adoption of hearing aids. In the case of captions, its increased presence in venues would lead to an increase in its use and in calls for it to be offered.

Audiologists and hearing instrument specialists need to start educating clients on how hearing aids can link into existing assistive listening systems via telecoils today, and on the promise of Auracast installations in the future. Providers must also continue to make consumers aware of the benefits of captioning in venues beyond the television set.

The future and communication access

Computer generated captions are continuing to improve in speed and accuracy and are beginning to be used on LED boards at live theaters and in other ways. It's expected they will become more prevalent as time passes. With assistive listening, the development of the Bluetooth LE Audio standard in 2022 promised a future offering Auracast™ for assistive listening. Auracast is intended to serve the general public as well as people with hearing loss⁹. With Auracast compatible wireless earbuds, smartphones and OTC hearing aids, all consumers will also be able to benefit from the technology. Its use will not be confined to assisting people with hearing loss but will, instead, benefit patrons in convention halls, sports stadiums, guided or self-guided tours, home TV rooms and countless applications. Venues will be incentivized to install and maintain Auracast systems.

Experts predict that it will take ten years for the technology to effectively supplant other assistive listening systems and find most hearing aid users Auracast capable. Until then, it is incumbent upon both hearing care providers and venues to continue to provide information and access to those technologies that work today.

With the support of providers, the hearing industry, and public venues of all types, consumers can have and will utilize the communication access they need and deserve.

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⁸ THE HEARING JOURNAL Wireless technology in hearing care NOVEMBER 2007 • VOL. 60 • NO. 11

⁹ <https://arxiv.org/abs/2303.02523>