

Livestreaming Music in the UK: Quantitative Analysis

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As part of a larger project on livestreaming, we created a survey to investigate how musicians' working lives have been impacted by COVID-19, and whether livestreaming has helped them. We also sought to discover musician and audience attitudes towards livestreaming, as well as the role that they think it will play in the future. Using exploratory factor analysis, we were able to identify several theoretical latent constructs in the data, which we converted to principal components to use in three multiple linear regression analyses. These allowed us to single out several variables that predicted the number of livestreams performed by musicians, and also the number watched/paid for by livestream viewers. A central theme that arose was the importance of communication during livestreams, both between audience and performer, and among audience members. Concerns about the lack of interaction and shared emotional experience appear to hold people back from watching. Opinion is mixed over whether livestreaming will provide musicians with a viable, additional income stream, but people agree that it has a role in the future for reaching new audiences, and also that it should embrace new possibilities made possible by the format rather than aim to replicate the physical concert experience.

1. Participants

1,484 Participants were recruited on a volunteer basis to take part in an online survey. Of these, 48% (n=707) self-identified as 'regular live music event attenders' and 52% (n=777) as 'professional performing musicians.' While care was taken not to distort the dataset by removing outliers whose responses were believable, we removed 4 attenders and 5 musicians on the basis of unrealistic responses (e.g., claiming to have watched 1000 concerts annually prior to the onset of COVID-19).

1.1. Attenders

23.5% (n=165) of attenders (n=703) were from Greater London. The next largest groups were from outside the UK (14.8%, n=104) and the South East (13.7%, n=96). There were smaller numbers from the South West (7.1%, n=50), Yorkshire and Humber (7.1%, n=50), the East of England (7%, n=49), and the East Midlands (6.8%, n=48). Fewer still were from the North West (5.1%, n=36), Scotland (4.8%, n=34) and the West Midlands (4.3%, n=30). Wales (2.8%, n=20), the North East (2.6%, n=18), and Northern Ireland (0.4%, n=3) were the worst represented locations.

55% of attenders were male (n=387), while 43.5% were female (n=306). The "other" (0.9%, n=6) and "I'd rather not say" (0.6%, n=4) categories were poorly represented. 62.7% (n=441) were ≥ 45 years of age (median age: "45-54"). The worst

represented age category was 18-24" (10.1%, n=71).

The vast majority of attenders were white, with "White - English, Welsh, Scottish, Northern Irish" accounting for 72.3% (n=508), and "Any other White background" accounting for 16.4% (n=115). "Asian - Chinese" accounted for 28 people (4%), and "White - Irish" accounted for 19 (2.7%). "I'd rather not say", "Any other ethnic group", "Mixed - White and Asian", "Any other Mixed or Multiple ethnic background", "Any other Asian background, Black - Caribbean", "Black - African", "Arab, Mixed - White and Black Caribbean", "Mixed - White and Black African," and "Asian - Indian" each contained <7 participants. "Any other Black, African or Caribbean background", "Asian - Pakistani", "Asian - Bangladeshi", and "White - Irish or Gypsy Traveller" were not represented at all.

The best represented attender genre preferences were for Rock (26.7%, n=188) and Classical (19.9%, n=140). Jazz (14.8%, n=104), Indie (13.9%, n=98) and Folk (9.8%, n=69) followed these. Pop (5.1%, n=36), Blues (3.1%, n=22) and Electronic (3.1%, n=22) all had modest numbers, while Country, Hip Hop/Rap, R&B/Soul, New Age, and Reggae each had ≤ 8 .

76.5% (n=538) of attenders indicated that they had watched livestreamed concerts since the start of the pandemic. 12.9% (n=91) had watched them pre-COVID-19, and 14.2% (n=100) had never watched any. 67% (n=474) indicated that they had paid to watch ≥ 1 livestream.

1.2. Musicians

27.7% (n=214) of musicians (n=772) were from Greater London. The next largest groups were from the South East (17%, n=131) and the South West (10.9%, n=84). There were smaller numbers from the North West (7.1%, n=55), Yorkshire and Humber (6.3%, n=49), Scotland (6.2%, n=48), the West Midlands (5.7%, n=44), and the East of England (5.3%, n=41). Fewer still were from the East Midlands (4.5%, n=35), Wales (3.8%, n=29), the North East (2.5%, n=19), and outside the UK (2.1%, n=16). The least represented location was Northern Ireland (0.9%, n=7).

68.5% (n=529) of musicians were male and 29.4% (n=227) were female, while there were only 8 participants each in the 'I'd rather not say' and 'other' categories. 85% (n=660) were between 25 and 64 years of age (median age: "45-54"), with just 4.8% (n=37) in the "18-24" category, and 9.7% (n=75) for "over 65."

The vast majority of musicians were "White - English, Welsh, Scottish, Northern Irish" (79.5%, n=614). The next largest group was "Any other White background" (10.2%, n=79). Very few participants were "White - Irish" (2.5%, n=19), "I'd rather not say" (1.8%, n=14), or "Any other Mixed or Multiple ethnic background" (1.7%, n=13). "Black - Caribbean", "Mixed - White and Asian", "Mixed - White and Black Caribbean", "Any other Asian background", "Asian - Indian", "Any other Black, African or Caribbean background", "White - Irish or Gypsy Traveller", "Asian - Chinese", "Black - African", "Arab", and "Any other ethnic group" each contained ≤ 7 participants. "Mixed - White and Black African", "Asian - Pakistani", and "Asian - Bangladeshi" were not represented at all.

29% (n=225) of musicians indicated they performed Classical. The next largest groups were Jazz (18.7%, n=144) and Folk (14.4%, n=111), followed by Pop (12.3%, n=95) and Rock (11%, n=85). Smaller numbers performed Blues (3.2%, n=25), Electronic (3.2%, n=25), Indie (3.1%, n=24), and R&B/Soul (2.3%, n=18). The least represented genres were Country (n=8), New Age (n=5), Reggae (n=5), and Hip Hop/Rap (n=2).

63% (n=485) of musicians indicated they had performed in livestreams since the start of the pandemic (mid-March 2020), while 33% (n=258) had been involved in setting up/organising livestreams (either for themselves or for others). 28% (n=220) had never performed in a livestream

nor been involved in setting up/organising one. 19% (n=149) had performed in livestream(s) in pre-COVID-19 times, and 7% (n=52) had been involved in setting up/organising livestream(s) pre-COVID-19.

2. Data acquisition and procedure

2.1. Survey

The participants filled out a 59-question¹ online survey which was designed in Qualtrics XM and made available on a bespoke website created for the project. The survey was comprised of 5 possible routes. The opening 2 questions ascertained whether participants were attenders or performers. Following this, attenders who had not paid for/watched livestreams answered a further 19 questions about their attendance, while musicians who had not performed livestreams answered their own set of 19 questions. Attenders who had *watched* livestreams answered an additional 10 questions, and those who had *paid* then answered a further 4 questions (bringing the total number of attender questions to 35). Musicians who had performed livestreams were also given their own further set of questions (n=5, bringing the total number of musician questions to 26).

The questions for attenders collected demographic information, compared the number of annual concerts/livestreams watched before and after March 2020 (the start of the UK national lockdown), ascertained participant involvement with watching livestreams, and examined how the pandemic had affected their spending on tickets for concerts in physical venues. They also explored their financial attitudes towards, and barriers holding them back from, watching livestreams, as well as their likelihood of doing so when pandemic restrictions are no longer in place. Their outlook on what livestreaming might, and should, look like in the future was also ascertained. Those that indicated they had watched livestreams were asked further questions about their experience of watching them. They were asked about the platforms, devices, and internet connection (e.g., WiFi vs. ethernet) that they had used; how many livestreams they had watched (including how many they had made a financial contribution towards); and about their feeling of connection with the performer and other viewers when watching them. Those that had paid for livestreams were asked how much they had spent on them annually before and

¹ This includes several open response questions, which are explored in the main report but not in the present quantitative analysis

after March 2020, and how much they would be willing to pay to watch livestreams from different types of artists (e.g., artists they are a fan of vs. artists they are unfamiliar with).

As with the attenders, the questions for musicians first collected demographic information. They also compared the number of concerts/livestreams performed annually before and after March 2020, ascertained how many performances had been cancelled and how much income had been lost as a result of the pandemic, and determined their level of involvement with livestreaming. Further to this, they explored musicians' financial attitudes towards, and barriers holding them back from, livestreaming, as well as their likelihood of doing it when pandemic restrictions are no longer in place. Similarly to the attenders, they were asked about their outlook on what livestreaming might, and should, look like in the future. Musicians who indicated that they had livestreamed were asked further questions about their experience of livestreaming, the platforms and ticketing companies that they had used, and how successful different approaches to generating income from it had been.

2.2. Adjectival scales

6-point adjectival scales (Harpe, 2015) were used to collect data on participant attitudes towards several aspects of livestreaming. They were as follows:

• Agreement scale

- Strongly agree
- Agree
- Somewhat agree
- Somewhat disagree
- Disagree
- Strongly disagree

[N/A]

• Likelihood scale

- Extremely likely
- Likely
- Somewhat likely
- Somewhat unlikely
- Unlikely
- Extremely unlikely

• Positivity scale 1

- Extremely positive
- Positive
- Somewhat positive
- Somewhat negative
- Negative
- Extremely negative

• Positivity scale 2²

- Extremely positive
- Very positive
- Somewhat positive
- Somewhat negative
- Very negative
- Extremely negative

• Successfulness scale

- Extremely successful
- Very successful
- Quite successful
- Quite unsuccessful
- Very unsuccessful
- Extremely unsuccessful

[N/A]

The horizontal, equally-spaced, presentation of these categories on the Qualtrics survey renders them similar to Likert-type items, but with the key difference that the latter should, properly, be labelled with equally-spaced integers (Harpe, 2015)³. Research suggests that humans represent numerically, or verbally, presented numbers on a mental number line (Dehaene et al., 1993). This is supported by the finding that they respond faster to smaller numbers with their left hands and faster to larger numbers with their right hands (known as the spatial-association of response codes effect, or SNARC) – an effect thought to be related to the direction in which their native language is written. As such, the responses to numbered categories may rely upon a more-or-less continuous internal number line. An unfortunate consequence of this is that it is more difficult to justify treating data from adjectival scales as continuous than it is for Likert-type item data. Resultantly, in this study data from individual adjectival scale questions has been treated as ordinal, and analysed with nonparametric statistics. However, even treating Likert-type item data as continuous is contentious. In their original usage, Likert took the mean (or, alternatively, sum) of multiple Likert items (thought to relate to a single underlying construct) to form 'Likert scales', which many argue produce interval-level data (rather than ordinal) thereby allowing parametric statistics to be considered (Harpe, 2015). Accepting it is controversial, the present study has identified

² Resulting from a typing error

³ Although the presentation of the categories with equally-spaced round checkboxes may have led participants to experience them as somewhat number-like.

several multi-item aggregated scales through exploratory factor analysis (EFA), and has treated the averaged items in each of these scales as continuous data. The factors uncovered through EFA were also used as the theoretical basis to create principal components (PCs) for regression analysis, using principal components analysis (PCA).

Likert items were, in their original formulation, 5-point scales including ‘neither agree nor disagree’ as the central point (Likert, 1932). However, research suggests that the central point is sometimes used as a “dumping ground” for unsure or non-applicable (N/A) responses, rather than as a genuine expression of neutrality (Kulas et al., 2008). Given the problems inherent in including a middle category, and the contention that all of our questions should be legitimately answerable with an at least mild indication of agreement vs disagreement, 6-point scales were chosen. As long as participants actually use all of the categories, rather than a smaller subset, including more of them also helps to make the response format more scale-like. The ‘N/A’ option was included sparingly, only for instances where the question might feasibly not be applicable to a participant and therefore their response should be excluded from the data set. When used, it was visually separated from the rest of the scale.

While most of the response formats followed the “Strongly Agree - Agree - Somewhat Agree - Somewhat Disagree - Disagree - Strongly Disagree” structure, or similar, some were more ambiguous, including both a ‘very’ and an ‘extremely’ option. It is possible this may have suggested to participants an 8-point scale, where two of the points weren’t available for a response, for example:

- Extremely positive
- Very positive
- [Positive]
- Somewhat positive
- Somewhat negative
- [Negative]
- Very negative
- Extremely negative

It’s unclear to what extent this may have influenced the results. Given the clearer adjectival scales used throughout most of the survey, it is feasible that participants will have been acclimatized to the response formats well-enough not have been affected by this difference in wording.

For the purpose of data analysis, the adjectival scale items were subsequently coded from -2.5 to 2.5, for example:

- Strongly disagree = -2.5
- Disagree = -1.5
- Somewhat disagree = -0.5
- Somewhat agree = 0.5
- Agree = 1.5
- Strongly Agree = 2.5

This both aided interpretation, and prepared the data for use in EFA and the formation of aggregated rating scales. The scale can be visualised as follows:

-2.5 ••• -1.5 ••• -0.5 •• [0] •• 0.5 ••• 1.5 ••• 2.5

As this numerical version of the scale was never presented to the participants, it is somewhat artificial and consequences may arise from the likelihood that many will have experienced it differently to this (including as entirely un-scalelike, ordered categories). Here are some possibilities:

a) [cat. 1] [cat. 2] [cat. 3] [cat. 4] [cat. 5] [cat. 6]

b) 1 ••• 2 ••• 3 ••• 4 ••• 5 ••• 6

c) •• 1 ••• 2 ••• 3 ••• 4 ••• 5 ••• 6 ••

d) -3 ••• -2 ••• -1 ••• [0] ••• 1 ••• 2 ••• 3

We chose our numerical visualisation as it represents degrees of positive or negative agreement without implying the existence of a neutral category never presented to the participants. In essence, ‘neutral’ lies halfway between ‘somewhat disagree’ and ‘somewhat agree’ for us. It should also be noted that the scales were presented to participants in the reverse order to this, running from positive to negative.

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3. Exploratory Factor Analysis (EFA)

3.1. EFAs

Maximum likelihood factor analyses (FA), and reliability analyses (Cronbach's α), were conducted for each question set comprised of adjectival scales. In all instances, we ran an initial analysis to obtain eigenvalues for each factor in the data, a scree plot, a table of reproduced correlations (to identify how many nonredundant residuals had absolute values $>.05$), a factor matrix, and a pattern matrix (produced through oblique rotation: direct oblimin). Decisions as to the best factor solutions were made on the basis of all of these, as well as interpretability. We used Cronbach's α to determine whether the question set could be made more reliable by omitting certain questions. In instances where this took place, we ran the EFA process again. Our factor solutions follow:

3.1.1 Attender Factor Solutions

Q16: "Your Experience of Watching Livestreams"

- Attenders that watched livestreams
- Maximum likelihood, with oblique rotation (direct oblimin)
- KMO = .845; Bartlett's Test of Sphericity $<.001$
- Total variance explained: 57.4%
- Cronbach's $\alpha = .849$

Pattern Matrix:

| Attenders: Q16 | Factor 1 | Factor 2 |
|--|--------------|--------------|
| "Visual quality of the livestreamed concerts" | 0.989 | -0.126 |
| "Sound quality of the livestreamed concerts" | 0.812 | 0.002 |
| "Setting/staging of the livestreamed concerts" | 0.646 | 0.153 |
| "internet connection when watching livestreamed concerts" | 0.451 | 0.163 |
| "The effort involved in accessing livestreams I had made plans to watch" | 0.009 | 0.772 |
| "Financial cost of accessing livestreams that are behind paywalls (i.e. that you can only access through payment)" | 0.031 | 0.641 |

Q28: "Connection to others in the livestreams you have watched"

- Attenders that watched livestreams
- Maximum likelihood, with oblique rotation (direct oblimin)
- KMO = .795; Bartlett's Test of Sphericity $<.001$
- Total variance explained: 73.9%
- Items removed (n=2): "Having friends or family watch a livestream with me in the same physical room is important to me."; "Performers acknowledging my presence in the audience during

the performance (e.g., mentioning me by name, or answering a question I've asked) makes me feel connected with them."

- Cronbach's $\alpha = .829$

Pattern Matrix:

| Attenders: Q28 | Factor 1 | Factor 2 | Factor 3 |
|---|--------------|--------------|--------------|
| "Performers talking directly to viewers of the livestream makes me feel connected with them" | 0.966 | -0.041 | 0.115 |
| "A sense of connection with other viewers of the same livestream is important to me" | -0.153 | 0.974 | 0.127 |
| "A sense of connection with the performer(s) during livestreaming is important to me" | 0.246 | 0.357 | -0.022 |
| "Seeing other viewers write in the chat (e.g. on YouTube) in response to the livestreamed music makes me feel connected with them" | -0.004 | -0.016 | 0.940 |
| "Seeing other viewers share emojis (e.g. on Twitter or Facebook) in response to the livestreamed music makes me feel connected with them" | -0.018 | -0.02 | 0.877 |
| "Hearing or seeing other viewers respond in real time to the music that is being livestreamed would make me feel connected to them" | 0.075 | 0.076 | 0.701 |

Q30: "Financial Attitudes towards Watching Livestreamed Concerts"

- Attenders
- Maximum likelihood
- KMO = .684; Bartlett's Test of Sphericity $<.001$
- Total variance explained: 45.2%
- Items removed (n=4): "I would pay more for being part of a smaller, more intimate group of viewers that have exclusive access to a livestreamed performance through limited ticket sales."; "I would pay more for access to a livestreamed performance that only happens live, with no recording available afterwards."; "The financial contributions I've made towards artists' livestreams have primarily been made out of a sense of charity."; "I would not pay to watch a livestream from a performer that performs/has performed some other livestreams for free."
- Cronbach's $\alpha = .742$

Factor Matrix:

| Attenders: Q30 | Factor 1 |
|---|--------------|
| “Livestreamed performances should be free to access for attenders/viewers” | 0.920 |
| “Attenders/viewers should be free to decide how much, if anything, they pay for livestreamed performances” | 0.696 |
| “The core purpose of livestreaming performances should be brand building and promotion, not income generation” | 0.557 |
| “Tickets for livestreamed performances should cost less than tickets for live performances in a physical venue” | 0.408 |

Q31: “Barriers Preventing You from Watching Livestreamed Concerts”

- Attenders
- Maximum likelihood, with oblique rotation (direct oblimin)
- KMO = .793; Bartlett’s Test of Sphericity <.001
- Total variance explained: 53.9%
- Items removed (n=1): “Uncertainty about how to access livestreams on various platforms”
- Cronbach’s α = .80

Pattern Matrix:

| Attenders: Q31 | Factor 1 | Factor 2 |
|--|--------------|--------------|
| “Lack of a shared emotional experience/response with other viewers when watching a livestream (as compared to a live concert in a physical venue)” | 0.877 | 0.018 |
| “Not being in the same physical room as the performer(s)” | 0.851 | -0.006 |
| “Having no /little interaction with fellow attenders” | 0.831 | 0.005 |
| “Technical issues such as buffering that interrupt the viewing experience” | -0.001 | 0.663 |
| “I don’t own or have access to a device whose quality would provide me with an enjoyable experience in terms of sound or visuals” | -0.055 | 0.588 |
| “The cost of accessing livestreams that are behind paywalls (i.e. that you can only access through payment)” | 0.153 | 0.429 |

Q33 & Q34: “Outlook into the Future”

- Attenders
- Maximum likelihood
- KMO = .789; Bartlett’s Test of Sphericity <.001
- Total variance explained: 54.7%
- Items removed (n=1): “Livestreaming will be a successful tool for reaching new audiences from geographical locations the artist has not physically toured to”
- Cronbach’s α = .816

Factor Matrix:

| Attenders: Q33 & Q34 | Factor 1 |
|---|--------------|
| Q34 Post-COVID-19, how likely are you to watch livestreamed performances? | 0.822 |
| Q33_4 In circumstances where it will be possible for me to do either, there will be occasions when I would choose to watch a livestream rather than go to a physical venue. | 0.775 |
| Q33_1 Once venues are safely open again (post-COVID-19), livestreaming will be a significant part of the music sector’s landscape | 0.713 |
| Q33_3 Livestreaming will be a successful tool for reaching new audiences that might be reluctant or unable to visit physical venues | 0.634 |

3.1.2 Musician Factor Solutions

Q51: “Financial Attitudes towards Livestreaming”

- Musicians
- Maximum likelihood
- KMO = .619; Bartlett’s Test of Sphericity <.001
- Total variance explained: 51.9%
- Items removed (n=2): “Tickets for livestreamed performances should cost less than tickets for live performances in a physical venue”; “Monetising livestreams through donations has a negative influence on artistic and programming decisions”
- Cronbach’s α = .718

Factor Matrix:

| Musicians: Q51 | Factor 1 |
|--|--------------|
| “Livestreamed performances should be free to access for attenders/viewers” | 0.925 |
| “Attenders/viewers should be free to decide how much, if anything, they pay for livestreamed performances” | 0.677 |
| “The core purpose of livestreaming performances should be brand building and promotion, not income generation” | 0.491 |

Q52: “Barriers Preventing You from Setting Up Livestreamed Concerts”

- Musicians
- Maximum likelihood, with oblique rotation (direct oblimin)
- KMO = .813; Bartlett’s Test of Sphericity <.001
- Total variance explained: 60%
- Items removed (n=1): “The amount of effort in setting up/organising a livestream”
- Cronbach’s α = .850

Pattern Matrix:

| Musicians: Q52 | Factor 1 | Factor 2 | Factor 3 |
|---|--------------|--------------|--------------|
| “My potential lack of legal knowledge relating to livestreams (if agree please specify the legal aspect/s you are concerned about)” | 1.048 | -0.057 | -0.048 |
| “The costs associated with setting up livestreamed concerts (e.g. copyright licence, using services of ticketing company)” | 0.463 | 0.159 | 0.236 |
| “Lack of technical equipment” | -0.054 | 0.939 | 0.04 |
| “Lack of relevant technical knowledge” | 0.068 | 0.818 | -0.036 |
| “Not knowing how interested viewers are in my performance if they didn’t pay to get access” | 0.001 | -0.075 | 0.782 |
| “Having no /little interaction with the audience” | -0.005 | -0.091 | 0.778 |
| “Not being able to earn enough income to make it worthwhile” | -0.01 | 0.014 | 0.651 |
| “Not having enough control over what the livestream looks and sounds like to the viewer” | 0.056 | 0.17 | 0.542 |
| “Lack of a fanbase/too small a fanbase” | 0.05 | 0.172 | 0.448 |

Q54: “Outlook into the Future”

- Musicians
- Maximum likelihood, with oblique rotation (direct oblimin)
- KMO = .855; Bartlett’s Test of Sphericity <.001
- Total variance explained: 54.5%
- Cronbach’s α = .874

Pattern Matrix:

| Musicians: Q54 | Factor 1 | Factor 2 |
|---|--------------|---------------|
| “Long term, earnings from livestreaming will provide a viable, additional income stream for musicians” | 0.827 | 0.092 |
| “Long term, livestreaming will be a successful tool for attracting audiences to my performances in physical venues” | 0.675 | -0.158 |
| “Once venues are safely open again (post-COVID-19), livestreaming will be a significant part of the music sector’s landscape” | 0.404 | -0.312 |
| “Long term, livestreaming should embrace new artistic possibilities made possible by the format instead of replicating performances in physical venues” | 0.343 | -0.290 |
| “Livestreaming will be a successful tool for reaching new audiences that might be reluctant or unable to visit physical venues” | 0.008 | -0.927 |
| “Livestreaming will be a successful tool for reaching new audiences from geographical locations the artist has not physically toured to” | 0.014 | -0.841 |

Q58: “Your experience of livestreaming”

- Musicians who have livestreamed
- Maximum likelihood, with oblique rotation (direct oblimin)
- KMO = .788; Bartlett’s Test of Sphericity <.001
- Total variance explained: 49.1%
- Items removed (n=1): “Setting/staging of the livestreams”
- Cronbach’s α = .773

Pattern Matrix:

| Musicians: Q58 | Factor 1 | Factor 2 |
|---|--------------|--------------|
| “Sound quality of the end product (i.e. the livestream)” | 0.994 | -0.094 |
| “Visual quality of the end product (i.e. the livestream)” | 0.690 | 0.026 |
| “Internet connection when livestreaming” | 0.521 | 0.163 |
| “Sense of connection with the audience during the livestreams” | -0.032 | 0.738 |
| “Effort involved” | -0.022 | 0.659 |
| “Income generated from livestreams for myself (rather than others/overall)” | 0.113 | 0.400 |

3.1.3 Combined Musician and Attender Factor Solutions

Q16 and Q58 Combined Data: “Your Experience of Livestreaming/Watching Livestreams”

- Musicians who have livestreamed and attenders who have watched livestreams
- Maximum likelihood
- KMO = .789; Bartlett’s Test of Sphericity <.001
- Total variance explained: 56.5%
- There were only 4 questions in common between Q16 and Q58
- Cronbach’s α = .835

Factor Matrix:

| Musicians & Attenders: Q16/Q58 | Factor 1 |
|---|--------------|
| “Sound quality of the livestreamed concerts” | 0.843 |
| “Visual quality of the livestreamed concerts” | 0.814 |
| “Setting/staging of the livestreamed concerts” | 0.705 |
| “Internet connection when watching livestreamed concerts” | 0.626 |

Q30 and Q51 Combined Data: “Financial Attitudes towards Livestreaming/Watching Livestreamed Concerts”

- Musicians and attenders
- Maximum likelihood
- KMO = .613; Bartlett’s Test of Sphericity <.001
- Total variance explained: 53.5%
- There were only 4 questions in common between Q30 and Q51
- Items deleted (n=1): “Tickets for livestreamed performances should cost less than tickets for live performances in a physical venue”
- Cronbach’s α = .731

Factor Matrix:

| Musicians & Attenders: Q30/Q51 | Factor 1 |
|--|--------------|
| “Livestreamed performances should be free to access for attenders/viewers” | 0.959 |
| “Attenders/viewers should be free to decide how much, if anything, they pay for livestreamed performances” | 0.660 |
| “The core purpose of livestreaming performances should be brand building and promotion, not income generation” | 0.501 |

Q33 and Q54 Combined Data: “Outlook to the Future”

- Musicians and attenders
- Maximum likelihood
- KMO = .688; Bartlett’s Test of Sphericity <.001
- Total variance explained: 65%
- There were only 3 questions in common between Q33 and Q54
- Cronbach’s α = .833

Factor Matrix:

| Musicians & Attenders: Q33/Q54 | Factor 1 |
|--|--------------|
| “Livestreaming will be a successful tool for reaching new audiences from geographical locations the artist has not physically toured to” | 0.908 |
| “Livestreaming will be a successful tool for reaching new audiences that might be reluctant or unable to visit physical venues” | 0.837 |
| “Once venues are safely open again (post-COVID-19), livestreaming will be a significant part of the music sector’s landscape” | 0.655 |

3.2. EFA Interpretation

The following underlying constructs have been theorised, following an exploration of the relative weightings of factor loadings:

3.2.1 Factors for Attenders

Q16

F1: “Positivity about the qualitative experience of watching livestreams”

F2: “Positivity about practical concerns when watching livestreams (e.g., effort, payment process)”

Q28

F1: “The feeling of connection when performers communicate with the audience”

F2: “The Importance of a sense of connection with others involved”

F3: “The feeling of connection when the audience respond to the event live”

Q30

F1: “Livestreaming should be free/cost less than a physical concert”

Q31

F1: “Dissimilarity to the usual physical concert experience (e.g., not being in the same room, and the lack of interaction/a shared emotional experience) is a barrier to attending livestreams”

F2: “Access issues (e.g. technology and the payment process) are a barrier to attending livestreams”

Q33 & Q34

F1: “Livestreaming has a future post-COVID-19”

3.2.2 Factors for Musicians

Q51

F1: "It should be possible to watch livestreams for free"

Q52

F1: "Legal/Copyright concerns are a barrier to livestreaming"

F2: "Technology is a barrier to livestreaming"

F3: "Concerns about the audience response (e.g., interest in/engagement with/experience of livestreams) are a barrier to livestreaming"

Q54

F1: "Livestreaming will be a helpful additional part of musicians' working lives in the future"

F2: "Livestreaming will be a successful tool for reaching audiences that wouldn't be able to attend otherwise"

Q58

F1: "Positivity about the experience of providing the qualitative audience experience during livestreams (e.g., sound, visual, no buffering issues)"

F2: "Positivity about the practical, as opposed to technical, side (connecting with the audience, the effort involved in putting a livestream together, the income generated from it)"

3.2.3 Combined Attender and Musician dataset

Q16 + Q58

F1: "Positivity about the qualitative experience of the livestreamed concert (sound, visuals, setting/staging, buffering etc.)"

Q30 + Q51

F1: "Livestreams should not be charged for"

Q34 + Q54

F1: "Livestreaming will play an important role post-COVID-19, allowing musicians to reach new audiences (e.g., from geographical locations the artist has not physically toured to, and those reluctant or unable to visit physical venues)"

3.3. Omitted Adjectival Scale Questions:

As the following adjectival scale questions were lost from the question sets during the EFA, where relevant they were recoded as dummy variables for potential use in the regression analyses that follow.

3.3.1 Attenders

- "Having friends or family watch a livestream with me in the same physical room is important to me" [feeling of connection]

- "Performers acknowledging my presence in the audience during the performance (e.g., mentioning me by name, or answering a question I've asked) makes me feel connected with them."

- "I would pay more for being part of a smaller, more intimate group of viewers that have exclusive access to a livestreamed performance through limited ticket sales."

- "I would pay more for access to a livestreamed performance that only happens live, with no recording available afterwards."

- "The financial contributions I've made towards artists' livestreams have primarily been made out of a sense of charity."

- "I would not pay to watch a livestream from a performer that performs/has performed some other livestreams for free."

- "Uncertainty about how to access livestreams on various platforms" [is a barrier to livestreaming]

- "Livestreaming will be a successful tool for reaching new audiences from geographical locations the artist has not physically toured to"

3.3.2 Musicians

- "Tickets for livestreamed performances should cost less than tickets for live performances in a physical venue"

- "Monetising livestreams through donations has a negative influence on artistic and programming decisions"

- "The amount of effort in setting up/organising a livestream" [is a barrier to livestreaming]

- [Positivity about the] "Setting/staging of the livestreams"

- "Post-COVID-19, how likely are you to set up /organise livestreams?"

3.3.3 Musician and attender combined data

- "Tickets for livestreamed performances should cost less than tickets for live performances in a physical venue"

4. Building predictive models

Having used EFA to uncover these theoretical latent constructs, we used PCA to convert them into PCs, which we could then include as variables in multiple linear regression analyses. We developed, and then tested, three theories about which variables might predict: the number of livestreams performed, the number of livestreams watched, and the amount of money spent on watching livestreams.

| | b | SE B | β | p |
|---|---------------------------|-------------|----------|----------|
| Constant | 1.12 (0.83, 1.418) | 0.15 | | <.001 |
| A) Agreement that it should be possible to watch livestreams for free | 0.23 (0.121, 0.331) | 0.05 | 0.18 | <.001 |
| B) Agreement that concerns about the audience response (e.g., interest in/engagement with/experience of livestreams) are a barrier to livestreaming | -0.32 (-0.418, -0.215) | 0.05 | -0.27 | <.001 |
| C) Agreement that livestreaming will be a helpful additional part of musicians' working lives in the future | 0.25 (0.138, 0.351) | 0.05 | 0.20 | <.001 |
| D) ln(Number of live performances booked for (or that they had set up) that had been cancelled since mid-March 2020) | 0.17 (0.086, 0.245) | 0.04 | 0.17 | <.001 |

Fig. 1: The coefficients from a multiple linear regression predicting the dependent variable: $\ln(\text{musicians' estimation of the number of livestreams that they would have given/performed in the year mid-March 2020 and mid-March 2021})$

4.1. Theory 1

For musicians that had livestreamed, we hypothesized that the following would predict the number of livestreams that they gave/performed in in the year beginning in mid-March 2020 (some positively, some negatively):

4.1.1 Hypothesized predictive variables

- Agreement that
 - it should be possible to watch livestreams for free
 - concerns about the audience response (e.g., interest in/engagement with/experience of livestreams) are a barrier to livestreaming [negative effect predicted]
 - technology is a barrier to livestreaming [negative effect predicted]
 - legal/copyright concerns are a barrier to livestreaming [negative effect predicted]
 - livestreaming will be a helpful additional part of musicians' working lives in the future
 - livestreaming will be a successful tool for reaching audiences that wouldn't be able to attend otherwise.
 - the amount of effort in setting up/organising a livestream is a barrier to livestreaming [negative effect predicted]
- Positivity about
 - the experience of providing the qualitative audience experience during livestreams (e.g., sound, visual, no buffering issues)"
 - the practical, as opposed to technical, side (connecting with the audience, the effort involved in putting a livestream together, the income generated from it)
 - the setting/staging of their livestreams" (For those that have done them)
- The likelihood that they would set up/organise livestreams post-COVID-19

- Age (over 35 vs under 35) and location (Greater London vs elsewhere)
- The number of live performances they had been booked for (or that they had set up) that had been cancelled since mid-March 2020 [it was predicted that more live performance work loss would have resulted in more livestreams]
- The number of live performances they gave annually pre-COVID-19 [it was predicted that musicians who had lost more performance work would have delivered more livestreams]
- Their income loss from live performance due to COVID-19 [it was predicted that musicians who had suffered greater income loss would have performed more livestreams]
- Whether or not they had livestreamed prior to the pandemic [it was predicted that musicians with prior experience of livestreaming would have performed more livestreams]

For these musicians, we conducted a multiple linear regression to predict a log transformation of (their estimation of) the number of livestreams they would have given/performed in in the year beginning in mid-March 2020 (see fig. 1). A significant regression equation was found ($F(4,471) = 29.19, p < .001$), with an R^2 of .20. 'A' to 'C' were PCs, while 'D' was a log-transformed variable. All were found to be significant predictors.

At face value, the model tells us the following:

- We expect about a 1.6% increase in the number of livestreamed concerts played when the number of live performances that were booked (or set up) and subsequently cancelled increases by 10%.
- For a one 'unit' increase in agreement that it should be possible to watch livestreams for free, we expect to see about 25.9% of increase in the geometric mean of the number of livestreams played.
- For a one 'unit' increase in agreement that concerns about the audience response (e.g., interest in/engagement with/experience of livestreams) are a barrier to livestreaming, we expect to see about

27.4% of decrease in the geometric mean of the number of livestreams played.

• For a one ‘unit’ increase in agreement that livestreaming will be a helpful additional part of musicians’ working lives in the future, we expect to see about 28.4% of increase in the geometric mean of the number of livestreams played.

Given the low R^2 , and the conceptual nature of discussing ‘units of agreement’ (note that the PC scores representing agreement are generally between 3 to 6 ‘units’ in length), these figures are only so useful. A qualitative interpretation (as follows) is probably a more fruitful approach, and the relative effect strengths for each independent variable can be most easily assessed through the standardized coefficients (β ’ in fig. 1).

4.1.2 Discussion

Musicians who believe livestreams should be watchable for free, perform more livestreams. This is similarly the case for those who think livestreams will be a helpful additional part of musicians’ working lives in the future. Concerns about the audience response (including their interest in, engagement with, and experience of livestreams) appear to hold people back from performing as many. The number performed was predictable on the basis of how many of musicians’ live performances were cancelled since March 2020. However, it was not predictable on the basis of how much of their income from live performance had been lost due to COVID-19. This might suggest that those who have livestreamed more have been doing it for the sake of continuing to perform, rather than from financial necessity. It also wasn’t predictable on the basis of concerns about technology, legal/copyright concerns, or the effort involved in putting a livestream on. There isn’t any indication that people who are livestreaming more now are likely to continue to do so post-COVID-

19, or that they believe it will be a successful tool for reaching new audiences in the future. Age (over vs under 35 years old), living in London, and prior livestreaming experience were not predictive.

There wasn’t evidence that those who have livestreamed more have felt more positive about the qualitative experience that their audience have had, how their livestreams have been set/staged, how connecting with the audience has gone, or the income generated.

4.2. Theories 2 & 3

For attenders that have watched livestreams, we hypothesized that the following would predict the number of livestreams they watched (theory 2), and the number of live streams paid for/donated to (theory 3), in the year beginning in mid-March 2020.

4.2.1 Hypothesized predictive variables

- Number of physical concerts they attended annually prior to COVID-19 [it was predicted that if they had watched more concerts before, they would have watched more livestreams after]
- The amount of money they spent on tickets for concerts in physical venues prior to COVID-19 [it was predicted that those who spent more on tickets prior to COVID-19 would have supported more livestreams since (theory 2), and paid more for them (theory 3)]
- Positivity about:
 - the qualitative experience of watching livestreams
 - practical concerns when watching livestreams (e.g., effort, payment process)
- Agreement that:
 - the audience’s live response to the event makes them feel connected

| | b | SE B | β | p |
|---|---------------------------|-------------|---------------------------|----------|
| Constant | 0.43 (0.136, 0.725) | 0.15 | | 0.004 |
| A) ln(Concerts watched annually pre-March 2020) | 0.52 (0.428, 0.604) | 0.05 | 0.45 | <.001 |
| B) Agreement that the audience’s live response to the event makes them feel connected | 0.25 (0.161, 0.343) | 0.05 | 0.21 | <.001 |
| C) Agreement that performers communicating with the audience makes them feel connected | 0.14 (0.045, 0.231) | 0.05 | 0.11 | 0.004 |
| D) Agreement that livestreaming should be free/cost less than a physical concert | 0.14 (0.043, 0.236) | 0.05 | 0.11 | 0.005 |
| E) Agreement that dissimilarity to the usual physical concert experience (e.g., not being in the same room, and the lack of interaction/a shared emotional experience) is a barrier to attending livestream | -0.44 (-0.538, -0.335) | 0.05 | -0.36 | <.001 |
| F) Positivity about practical concerns when watching livestreams (e.g., effort, payment process) | 0.12 (0.014, 0.215) | 0.05 | 0.10 | 0.026 |
| G) Age | 0.28 (0.058, 0.508) | 0.11 | 0.10 | 0.014 |

Fig. 2 The coefficients from a multiple linear regression predicting the dependent variable: ln(attendees’ estimation of how many livestreamed concerts they would have watched online in the year from mid-March 2020 and mid-March 2021)

| | b | SE B | β | p |
|---|------------------------|-------------|----------|----------|
| Constant | 0.39 (0.037, 0.738) | 0.18 | | 0.03 |
| A) Ln(Concerts watched annually pre-March 2020) | 0.39 (0.282, 0.489) | 0.05 | 0.33 | <.001 |
| B) Estimate of the average amount of money they had annually spent on tickets for attending concerts in physical venues prior to COVID-19 times? | 0.28 (0.028, 0.537) | 0.13 | 0.10 | 0.029 |
| C) Positivity about practical concerns when watching livestreams (e.g., effort, payment process) | 0.16 (0.049, 0.271) | 0.06 | 0.14 | 0.005 |
| D) Agreement that the audience's live response to the event makes them feel connected | 0.17 (0.072, 0.271) | 0.05 | 0.15 | 0.001 |
| E) Agreement that performers communicating with the audience makes them feel connected | 0.1 (-0.007, 0.204) | 0.05 | 0.08 | 0.068 |
| F) Agreement that dissimilarity to the usual physical concert experience (e.g., not being in the same room, and the lack of interaction/a shared emotional experience) is a barrier to attending livestream | -0.32 (-0.438, -0.206) | 0.06 | -0.27 | <.001 |
| G) Agreement that livestreaming has a future post-COVID-19 | 0.22 (0.103, 0.33) | 0.06 | 0.18 | <.001 |

Fig 3. The coefficients from a multiple linear regression predicting the dependent variable: $\ln(\text{attenders' estimation of how many livestreamed concerts they had paid to watch/donated to ever})$. 'E' was not significant but was kept in as it generated a higher adjusted R^2 and was somewhat close to significance.

- a sense of connection with the performer/other attenders is important
 - performers communicating with the audience make them feel connected
 - livestreaming should be free/cost less than a physical concert
 - dissimilarity to the usual physical concert experience (e.g., not being in the same room, and the lack of interaction/a shared emotional experience) is a barrier to attending livestream [negative effect predicted]
 - access issues (e.g. technology and the payment process) are a barrier to attending livestreams [negative effect predicted]
 - uncertainty about how to access livestreams on various platforms is a barrier to livestreaming [negative effect predicted]
 - livestreaming has a future post-COVID-19
 - having friends or family watch a livestream with them in the same physical room is important to their feeling of connection
 - performers acknowledging their presence in the audience during the performance (e.g., mentioning them by name, or answering a question they have asked) makes them feel connected with them.
 - the financial contributions they have made towards artists' livestreams have primarily been made out of a sense of charity [included to discover if this sentiment is held by those who have watched more (theory 2), and paid for more livestreams (theory 3)]
 - they would not pay to watch a livestream from a performer that performs/has performed some other livestreams for free [included as if those that are watching more livestreams feel this way, then this could inform musicians' future practice]
- Age (over 35 vs under 35) and location (Greater London vs elsewhere)

For livestream attenders, we conducted a multiple linear regression to predict a log transformation of (their estimation of) the number of livestreams they had watched in the year beginning March 2020 based upon variables 'A' to 'G' in the accompanying table (see fig. 2). A significant regression equation was found ($F(7,450) = 39.21$, $p < .001$), with an R^2 of .38. 'A' was a log transformed variable, 'B' to 'F' were PCs, and 'G' was dummy coded as 0 = 'below 35 years of age' and 1 = '35 and older.' All were significant predictors of the number of livestreams watched.

At face value, the model tells us the following:

- We expect about a 5% increase in livestreams watched online since mid-March 2020 when the number of *concerts* watched pre-March 2020 increases by 10%.
- For a one 'unit' increase in agreement that the audience's live response to the event makes them feel connected, we expect to see c.28.7% of increase in the geometric mean of the number of livestreams watched.
- For a one-'unit' increase in agreement that performers communicating with the audience makes them feel connected, we expect to see c.14.8% of increase in the geometric mean of the number of livestreams watched.
- For a one 'unit' increase in agreement that livestreaming should be free/cost less than a physical concert, we expect to see c.15% of increase in the geometric mean of the number of livestreams watched.
- For a one 'unit' increase in agreement that dissimilarity to the usual physical concert experience (e.g., not being in the same room, and the lack of interaction/a shared emotional experience) is a barrier to attending livestream, we

expect to see about 35.4% of decrease in the geometric mean of the number of livestreams watched.

- For a one 'unit' increase in positivity about practical concerns when watching livestreams (e.g., effort, payment process), we expect to see about 12.2% of increase in the geometric mean of the number of livestreams watched.

- For age, the expected percent increase in geometric mean for livestreamed concerts watched online since mid-March 2020, from 'under 35' to '35 and over,' is about 32.7%, holding other variables constant.

Given the modest R^2 , and the conceptual nature of discussing 'units of agreement,' these figures may be most useful as an aid to a more qualitative interpretation, as follows:

4.2.2 Discussion

People who watched more concerts in physical venues prior to COVID-19 watched more livestreams since March 2020, however there wasn't any evidence that this was the case for people who had *spent* more. Older participants (over the age of 35) watched more livestreams also, as did attenders who felt the audience's live response, and the performers communication with the audience, made them feel connected. This suggests that musicians should attend to these considerations when livestreaming. Attenders who watched more livestreams felt that they should either be free or cost less than a concert in a physical venue. Those who felt that dissimilarity to the usual physical concert experience (e.g., not being in the same room, and the lack of interaction/a shared emotional experience) was a barrier to attending, tended to watch fewer livestreams. This suggests that musicians should aim to address these points. Those who were positive about their experience of practical issues such as the effort involved in watching livestreams, and the payment process, watched more livestreams.

By contrast, the number of livestreams watched was not predicted by positivity towards the qualitative experience of watching livestreams, the notion that a sense of connection with the performer/other attenders is important (which is interesting given that attenders who felt connected to the performers/other attenders watched more livestreams), or that performers acknowledging their presence in the audience during the performance (e.g., mentioning them by name, or answering one of their questions) made them feel connected with them. There was no indication that watching livestreams with friends or family

physically present was predictive. This was similarly the case for whether or not the financial contributions they had made towards artists' livestreams had primarily been made out of a sense of charity, and if they would pay to watch a livestream from a performer that performs/has performed some other livestreams for free. Access issues (e.g., technology and the payment process) and uncertainty about how to access livestreams on various platforms were not predictive. Being located in London didn't have an influence, and there wasn't any indication that those watching more livestreams also generally believe that livestreaming has a future post-COVID-19.

For attenders who had *paid for/donated to* at least one livestream, we conducted a multiple linear regression to predict a log transformation of (their estimation of) the number of livestreams they had paid for/donated to (ever) based upon variables 'A' to 'G' in the accompanying table (see fig. 3). A significant regression equation was found ($F(7,398) = 24.7, p < .001$), with an R^2 of .30. 'A' was a log transformed variable, 'B' was dummy coded 0 = 'less than or equal to £100' and 1 = over £100, and 'C' to 'F' were PCs. All were significant predictors of the number of livestreams paid for/donated to.

At face value, the model tells us the following:

- We expect about a 3.8% increase in the number of livestreamed concerts paid for when the number of physical concerts watched pre-March 2020 increases by 10%.
- For a one 'unit' increase in agreement that performers communicating with the audience makes them feel connected, we expect to see about 10.5% of increase in the geometric mean of the number of livestreams paid for.
- For a one 'unit' increase in positivity about practical concerns when watching livestreams (e.g., effort, payment process), we expect to see about 17.4% of increase in the geometric mean of the number of livestreams paid for
- For a one 'unit' increase in agreement that the audience's live response to the event makes them feel connected, we expect to see about 18.5% of increase in the geometric mean of the number of livestreams paid for.
- For a one 'unit' increase in agreement that dissimilarity to the usual physical concert experience (e.g., not being in the same room, and the lack of interaction/a shared emotional experience) is a barrier to attending livestream, we expect to see about 27.4% of decrease in the geometric mean of the number of livestreams paid for
- For a one 'unit' increase in agreement that livestreaming has a future post-COVID-19, we expect to see about 24.6% of increase in the

geometric mean of the number of the number of livestreams paid for

- The expected percent increase in geometric mean the number of the number of livestreams paid for, when their annual spending on tickets for concerts in physical venues pre-COVID-19 increases from 'less than or equal to £100' to 'over £100', is about 32.3% (holding other variables constant).

Given the modest R^2 , and the conceptual nature of discussing 'units of agreement,' these figures may be most useful as an aid to a more qualitative interpretation, as follows:

4.2.3 Discussion

The variables that predicted (and didn't predict) the number of livestreams actually paid for were similar, but different in a few important ways. Attenders that had paid more to watch concerts pre-COVID-19 also paid to watch more livestreams. People who agreed that livestreaming has a future post-COVID-19 paid for more livestreams (and those that disagreed paid for fewer). Agreement that livestreams should cost less than concerts in a physical venue (or be free) didn't predict the number of concerts that paying attenders had paid for. Similarly, being over or under the age of 35 didn't have any impact when it came to payment.

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5. Overview of musician and attender responses

5.1. The impact of COVID-19 on physical performances and livestreaming practice

5.1.1 Concerts/livestreams watched

Prior to COVID-19, the median number of concerts watched by attenders ($n=703$) annually in physical venues was 15 (range: 0 to 260). 77% indicated they generally watched ≤ 30 (96% watched ≤ 100). 72% of attenders hadn't watched a livestream prior to COVID-19, while 25% had watched between 1 and 5 annually. Two extreme cases had watched 103 and 200 respectively, however the remaining participants watched ≤ 30 . In the year that began in March 2020, attenders estimated they would have attended a median of 0 physical concerts (range: 0 to 69). 94% indicated that they had watched ≤ 5 , with this figure incorporating 65% that hadn't watched any at all. The median number of livestreams they estimated they had have watched was 5 (range: 0 to 200). 66% had watched ≤ 10 , incorporating 16% who hadn't watched any at all.

90% of the participants had watched ≤ 30 livestreams.

The median number of concerts performed by musicians ($n=772$) annually in physical venues prior to COVID-19 was 60 (range: 0 to 600). 93% had performed ≤ 200 concerts, incorporating 72% that performed ≤ 100 . For livestreamed concerts (range: 0 to 150), 76% indicated they had never performed a livestream, while 21% had performed between 1 and 10. In the year that began in March 2020, musicians estimated they would have performed a median of 2 concerts in physical venues (range: 0 to 320). 90% had performed ≤ 30 concerts, incorporating 78% who had performed ≤ 10 . 35% had not performed a physical concert at all. For livestreams in this period, the median was 2 (range: 0 to 170). 83% had performed ≤ 10 , incorporating 10% that had performed 1 and 36% that hadn't performed any at all.

5.1.2 Income lost

73% of attenders estimated they had spent $\leq £500$ (median: '£251-£500') annually on physical concerts prior to COVID-19. By contrast, for the year starting from March 2020, 79% of attenders indicated they would have spent $\leq £50$ (median: '£0'). 5% of musicians ($n=40$) indicated that they hadn't had any performances cancelled since March 2020, however due to the phrasing of the question it wasn't possible to ascertain if this meant they had performances that were able to go ahead or if they simply didn't have performances organized that could be cancelled. Of those that did have performances cancelled ($n=732$), 50% had lost ≥ 35 (range: 1 to 400). Musicians' median estimated income loss from performance work due to COVID-19 was £9000 (range: £500,000 loss to £45,000 gain - note that responses were given to the nearest £500).

5.1.3 Payment for livestreams

The median number of livestreams attenders had watched since March 2020 was 10 (range 0 to 250), with 76% indicating they had watched ≤ 20 . By comparison the median number of livestreams they had *paid* for (ever) was 4 (range 0 to 200), with 79% having paid for ≤ 10 , incorporating 30% who had paid for between 1 and 4, and 21% who hadn't paid for any.

Of those that paid to watch livestreams ($n=474$), 76% hadn't spent anything on them prior to COVID-19 and only 13% indicated they had spent $>£20$. By contrast, 53% estimated they would have spent $>£50$ on them in the year beginning in March

2020 (median: '£51-£100'), with 42% spending between £51 and £250.

The medians for the estimated highest, lowest, and average amounts spent on livestreams were £17.25, £5, and £10 respectively. 73% of participants indicated they would be willing to pay ≤£20 on an artist they are a fan of (median: £10). 70% were willing to pay ≤£10 on an artist they somewhat like (median: £10), and for an artist they are unfamiliar with, 61% indicated they were willing to pay ≤£5 (median: £5), incorporating 21% that wouldn't pay anything at all.

5.2. Platforms and ticketing companies used by musicians and attenders

For attenders that had watched livestreams (n=600), the most used platforms were YouTube (n=503, 84%) and Facebook (n=376, 63%). The next most used were 'Other' (n=131, 22%), Vimeo (n=124, 21%), and Instagram (n=120, 20%). 'Custom-designed livestreaming platform' (n=84, 14%), and Twitch (n=83, 14%) had smaller numbers, and even fewer attenders used StageIt (n=40, 7%), Twitter/Periscope (n=24, 4%), and Idagio (n=10, 2%). Streamzy, Brightcove, DaCast, YouNow, Panopto, Kaltura, and Streetjelly were used by ≤4 attenders each. IBM Cloud Video, Qumu, and Yoop were not used at all.

More livestreaming musicians (n=552) used Facebook (n=383, 69%) to livestream than YouTube (n=319, 58%). The next most-used platforms were Instagram (n=107, 19%) and 'Other' (n=99, 18%). More modest numbers used Vimeo (n=49, 9%), Twitch (n=48, 9%), and 'Custom-designed livestreaming platform' (n=46, 8%), and even fewer people used Twitter/Periscope (n=17, 3%). StageIt, DaCast, Idagio, IBM Cloud Video, Kaltura, Brightcove, YouNow, Streamzy and Yoop were all used by ≤7 attenders each, while Panopto, Streetjelly, and Qumu were not used at all.

43% (n=238) of livestreaming musicians indicated they had not used a separate ticketing company for the livestreams they had set up/organised, and 37% (n=205) had not set up, or organised, any for themselves at all. The most popular ticketing companies were 'Other' (n=67, 12%) and Eventbrite (n=63, 11%). Ticket Source, See Tickets, and Eventix were all used by ≤5 participants, while Seat Advisor, Billetto, Universe, Thundertix, and Showpass were not used at all.

5.3. Devices used to watch livestreams

Laptops were the most commonly used device for watching livestreams (n=313, 52%). Following this was the television (n=198, 33%), the mobile phone (n=124, 21%), the tablet (n=106, 18%), and the desktop computer (n=105, 18%). 5% of attenders selected 'Other' (n=32). 88% (n=530) watched livestreams using a WiFi connection, whereas just 16% (n=94) used an ethernet connection. 7% (n=41) indicated they used mobile data (3G/4G/5G) to watch livestreams, while 3 people selected 'Other.'

5.4. Experience of performing/watching livestreamed concerts

To ease interpretation, means from aggregated rating scales will be presented as 'percentage agreement/likelihood/positivity/successfulness' (PA/PL/PP/PS; negative percentages indicating negative sentiments, e.g., disagreement), rather than on a scale from -2.5 to 2.5. These will be calculated by dividing the original score by 2.5. Medians will be reported with their associated description (e.g., 0.5 = "somewhat agree").

Attenders (n=600) were positive (PP=39%) about the qualitative experience of livestreams they had watched, with most responses reflecting different degrees of positivity. This incorporated aspects such as the sound and visual quality, the internet connection (buffering issues etc.), and how the livestreams had been set/staged. Musicians were also positive about the experience they had of these aspects when delivering livestreams (PP=27%), again with most responses reflecting different degrees of positivity. For musicians, this incorporated the internet connection, sound, quality, and visual quality. The pattern of responses for setting/staging livestreams was very similar, with 88% responses indicating degrees of positivity (median='somewhat positive'). Attenders were also positive (PP=42%) about the practical concerns when watching livestreams, with very few negative responses. This reflected aspects such as the effort involved in accessing livestreams they had made plans to watch, and the costs involved in paying for livestreams behind paywalls.

Musicians (n=552) were overall positive, to varying degrees, about the experience of the effort involved in livestreaming (median: "somewhat positive"), although 39% indicated negativity. 71% were negative about the income they had generated for themselves from livestreams (median: "somewhat negative"), incorporating 26% who were "extremely negative." A noteworthy 23% also indicated that they were "somewhat positive."

Sentiment was split as to the sense of connection with the audience during livestreams, with 52% indicating negativity. Responses were centred on the two “somewhat” categories (the mode was actually “somewhat positive”), but there were more “very negative” and “extremely negative” responses than their positive counterparts. Attenders’ feelings about the sense of connection are explored in the next section.

5.5. Connection with others while watching livestreams

72% of attenders who had watched livestreams (n=600) expressed different degrees of agreement that a sense of connection with other viewers during a livestream is important to them (median: “somewhat agree”), with 40% selecting “somewhat agree.” Relating to this, they mostly felt that their sense of connection with other viewers had *been* moderately positive (median and mode: “somewhat positive”).⁴ There was a wide spread of responses about the feeling of connection when other viewers respond to the event live, with a fairly normal distribution centring on a moderate positivity (PP=6%). This incorporated aspects such as seeing other viewers sharing emojis, and writing in the chat, as well as actually hearing them and/or seeing video of them responding in real time. There was a mixed picture as to whether having friends or family watching with them in the same physical room is important to them, with 58% agreeing, but the separate patterns of responses for agreement and disagreement indicating that those who disagreed did so more firmly than those who agreed.

Attenders firmly agreed that a sense of connection with the performer(s) during livestreams is important to them (median and mode: “agree”). They were also broadly positive about the experience they had of this (median and mode: “somewhat positive”).⁵ They were in firm agreement that performers talking directly to viewers of the livestream makes them feel connected, with 38% agreeing, and 35% strongly agreeing. They also agreed that performers acknowledging their presence in the audience during the performance (e.g., mentioning them by name, or answering one of their questions) makes them feel connected with them (median: ‘agree’, mode: ‘strongly agree’).

⁴ Due to an error in the original wording of this question, we only analysed responses from when it was fixed (>26/01/21, n=542)

5.6. Attitudes towards monetizing livestreams

Musicians (n=772) and attenders (n=703) both largely disagreed that livestreams should be free to watch (musicians PA=-20%, attenders PA=-24%), although there was a little agreement in both instances. Attenders didn’t have strong feelings as to whether they should be free to decide *how much*, if anything, they pay for livestreamed performances, with 28% somewhat disagreeing and 32% somewhat agreeing (median: “somewhat agree”).

Both musicians (80%; median: “somewhat agree”) and attenders (93%; median: “agree”) agreed that tickets for livestreamed performances should cost less than those for performances in a physical venue. The pattern of agreement responses indicated that attenders felt more strongly about this.

Attenders were presented with scenarios for which they might feel inclined to pay different amounts. There was a spread of responses as to whether they would pay more to access livestreams that happen only once, without a recording made available to watch afterwards, with 23% “somewhat disagreeing” and 24% “somewhat agreeing” (median: “somewhat agree”). 63% disagreed that they would pay more for being part of a smaller group of viewers that have exclusive access to a livestreamed performance through limited ticket sales (median “somewhat disagree”). Of those that agreed, few did so strongly. Interestingly 78% of attenders disagreed that a performer having presented other livestreams for free would put them off paying to watch them perform a livestream (median: “somewhat disagree”, mode: “disagree”). For musicians, there was a fairly even split as to whether livestreaming for donations has a negative influence on artistic and programming decisions (median: “somewhat disagree”), with equal numbers “somewhat agreeing” and “somewhat disagreeing” (27% in both instances). Attenders were split as to whether the financial contributions they had made towards artists’ livestreams had primarily been made out of a sense of charity (median: “somewhat agree”).

5.7. Barriers from livestreaming/watching livestreams

Musicians (n=772) mainly agreed, to varying degrees, that technology is a barrier (PA=13%),

⁵ See footnote 4

although many also disagreed. This incorporated both a lack of relevant technical knowledge and equipment. 86% of attenders (n=703) disagreed that they were held back from watching livestreams through not owning, or having access to, a device whose quality would provide them with an enjoyable audio or visual experience (median: “disagree”; “strongly disagree” and “agree” = 38% each). There was a more mixed picture as to whether they were held back by technical issues, such as buffering, interrupting the viewing experience (median: ‘somewhat agree’).

77% of musicians agreed (PA:24%) they were held back by concerns about the audience’s interest, engagement, and experience. These included considerations about the size of their fanbase, whether the income earned would be worthwhile, control over the audio and visual experience of the viewers, interaction with the audience, and how interested non-paying viewers would be in their performances. Whether or not attenders’ lack of shared experience with other attenders was a barrier elicited a balanced spread of responses, with the more moderate ones dominating (PA=-0.8%). On investigation, the responses differed between those who had (PA=53%; 50% indicating a degree of disagreement) and hadn’t (PA=-9%; 88% indicating a degree of agreement) watched livestreams. 62% of attenders agreed that not being in the same physical room as the performer was a barrier (median: “somewhat agree”). The most popular indication of disagreement was “disagree,” whereas for agreement it was “strongly agree.” On investigation, those who hadn’t livestreamed were in clear agreement about this (96% indicating a degree of agreement), whereas it was a very mixed picture for those that had (56%).

There was a fairly even split as to whether a potential lack of legal knowledge about livestreaming was a barrier for musicians, with 50% disagreeing. Those that disagreed mostly “somewhat disagreed”/“disagreed,” whereas 12% “strongly agreed.” 66% agreed that the costs associated with setting up livestreamed concerts (e.g. copyright licence, using services of ticketing company) were a barrier (median: “somewhat agree”). Those that disagreed mostly “somewhat disagreed”/“disagreed,” and this pattern of responses was replicated in the corresponding agreement categories. On investigation, musicians who hadn’t livestreamed firmly agreed that this was a barrier (80% indicating a degree of agreement), whereas picture was more mixed for those that had. 67% agreed that the effort in setting up/organising livestreams held them back. The most popular response expressing disagreement with this was ‘disagree’ (15%).

73% of attenders disagreed that they were held back by uncertainty about how to access livestreams on various platforms (median and mode: “disagree”), while 62% disagreed that the cost of accessing livestreams that are behind paywalls was a barrier (median: “somewhat disagree”). For the latter, 25% indicated that they “somewhat agreed.”

5.8. Outlook into the future

Musicians (n=772) and attenders (n=703) agree that livestreaming has a future of some sort beyond COVID-19. 68% of attenders agreed that once venues are safely open again, livestreaming will be a significant part of the music sector’s landscape (median: “somewhat agree”), and 60% of musicians were positive about this too, also indicating that it will be a successful tool for attracting audiences to their physical performances (PA:15%). However, whether or not musicians thought that, long term, earnings from livestreaming will provide a viable, additional income stream for musicians, provided us with a mixed picture (median: “somewhat disagree”). For this, most of the agreement was moderate (“somewhat agree”: 26%), whereas all three disagreement categories were well-represented, with 14% strongly disagreeing.

Regarding the function that livestreaming may play in the future, musicians and attenders firmly agreed that it will be a successful tool for reaching new audiences, including those from geographical locations they have not physically toured to, and those that are reluctant (or unable) to visit physical venues (musicians PA:40%; attenders PA:48%). Whether or not attenders would, given the option, choose to watch a livestream rather than go to a physical venue presented a very mixed picture (56% disagreed). For this, the pattern of disagreement was stronger than the pattern of agreement, with 23% ‘strongly disagreeing’ as compared to 8% ‘strongly agreeing.’ On investigation, attenders who hadn’t watched livestreams were in firm disagreement about this (79% indicated a degree of disagreement), whereas for those that had it was a mixed picture. Musicians firmly agreed (84%) that livestreaming should embrace new artistic possibilities made possible by the format instead of replicating performances in physical venues (median = “agree”).

65% of attenders indicated that they were likely to watch livestreamed performances post-COVID-19 (median: “somewhat likely”), while there was a roughly even split for musicians’ continuing to perform them (median: “somewhat unlikely”). Their responses were largely moderate in both directions, although the overall picture was

marginally in favour of unlikelihood. On investigation, attenders who *had watched* livestreams were likely to continue post-COVID-19 (87%) and those who hadn't were unlikely (76%). Similarly, musicians who hadn't livestreamed were unlikely to livestream post-COVID-19 (69%) and it was a mixed picture for those who had.

5.9. Successfulness of payment methods

For questions intended to help us compare how successful different payment methods were, an 'N/A' option was included to ensure we only collected data from participants that had actually *tried* any given method. With the exception of answering about box-office splits and fixed fees from promoters, musicians who had livestreamed were asked to make judgements 'as [a] promoter/co-promoter of livestream(s).'

Overall, the two most popular options were payment through donations (n=274; median: "quite successful") and receiving fixed performance fees from promoters (n=307; median: "quite successful"). 53% found donations to be successful, although this was largely comprised of participants who selected "quite successful" (38%). 13% selected "extremely unsuccessful." Perhaps unsurprisingly, 74% of musicians indicated that receiving fixed performance fees was a successful method (median and mode: "quite successful").

58% of (n=196) musicians rated fixed price ticket sales as differing degrees of unsuccessful (median: "quite unsuccessful"). Of those that rated it as successful, most were in the "quite successful" category (32%). Also broadly unsuccessful (58%) were pay-what-you-want ticket sales (n=132; median: "quite unsuccessful"), which included 18% who found them "extremely unsuccessful." By contrast, 30% of (n=98) participants found them "somewhat successful." 72% of musicians found monetization through subscription (e.g. Twitch, YouTube, Patreon/Crowdcast) was unsuccessful (median = "quite unsuccessful"), incorporating 33% who found it to be extremely so. 19% did however rate it as "quite successful." 52% of (n=149) participants found the 'box office split' arrangement to be unsuccessful (median = "quite unsuccessful"). The successful responses were mostly contributed to by 40% who selected "somewhat successful." By contrast the three categories for unsuccessful all had decent representation, with 22% finding it "extremely unsuccessful."

Least popular of all were advertisements shown before/during/after the performance (n=84; median = between "very unsuccessful" and "extremely unsuccessful") and sponsorship (n=92; median =

"quite unsuccessful"). 85% found that using advertisements was unsuccessful, which incorporated 50% who found it "extremely unsuccessful." 65% found sponsorship unsuccessful, incorporating 41% who found it "extremely unsuccessful." However, there were 24% who found it "quite successful."

39 musicians indicated that they had tried all of the monetization methods presented. For these, a Friedman's ANOVA uncovered a significant difference between the distributions for the success ratings for the different methods, $\chi^2_F(7) = 41.26$, $p < .001$. Pairwise comparisons suggested this was due to significant differences between ratings for monetization via donations (Mdn = "quite unsuccessful") vs advertisements (Mdn = "very unsuccessful"), $p < 0.05$, and donations (Mdn = "quite unsuccessful") vs sponsorship (Mdn = "very unsuccessful"), $p < 0.05$.

156 participants only gave a response to a single item, indicating that this method was the only one that they had tried (of those that we'd presented). An exploration of the data revealed that the only methods selected by >5 of these participants were fixed performance fees, and donations. Participants who had received fixed performance fees (n=106, mean rank = 84.87) found this method to be significantly more successful than those who made money from donations (n=42, mean rank = 48.32), $U = 3325.5$, $z = 4.927$, $r = 0.29$. Although the medians are the same for both groups ("somewhat successful"), for donations the ratio of successfulness to non-successfulness was 85.8% vs 14.2%, whereas for fixed performance fees it was 59.5% to 40.5%.

Further exploration of the data revealed that 75 participants had provided ratings for fixed price ticket sales, donations, pay-what-you-want ticket sales, and fixed performance fees (thus indicating that they had tried all of these methods). There was a significant difference between the distributions for the success ratings for different monetization methods for livestreaming, $\chi^2_F(3) = 15.05$, $p < .01$. Pairwise comparisons suggested this was due to a significant difference between ratings for fixed price ticket sales (Mdn = "quite unsuccessful") vs fixed performance fees from promoters (Mdn = "quite successful"), $p < 0.05$.

6. Genre

It seems likely that musicians and attenders with different genre preferences will have taken to livestreaming differently. As such, we set out to test if there are more 'prolific livestreamers' (those that have performed ≥ 10 livestreams) within certain

genres. As some of the genres were poorly represented, we were only able to test this hypothesis on Blues, Classical, Electronic, Folk, Jazz, Pop, R&B/Soul, Rock, and Indie. We found that genre is not independent of prolific-vs-non-prolific livestreaming activity - the association between the two was significant), $\chi^2(8) = 22.19$, $p < 0.01$. Cramer's V was 0.17. Post hoc tests tell us that the proportion of jazz musicians who were prolific livestreamers (12%) was significantly smaller than the proportion for Folk (30%), and for Pop (31%) musicians.

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7. Summary

The survey indicates that musicians and attenders who have livestreamed/watched livestreams have been generally happy with the in-the-moment experience. But for a few who were moderately positive, musicians were overall much less pleased with the income they had generated from it, and there were a wide range of conflicting attitudes about the sense of connection they've felt with the audience while performing. On this topic, attenders value a sense of connection with both the performer(s) and other attenders. For the former, this experience is increased by performers acknowledging their presence in the audience during the performance (for example, mentioning them by names, or answering one of their questions). Attenders were more conflicted over the latter, but there was an overall moderately positive response to seeing other attenders use emojis, writing in the chat, and seeing/hearing them respond in real time. Neither group thought that livestreams should be free to watch, although both agreed that they should cost less than physical venue tickets. Their response to strategies for raising the financial value of livestreams, such as restricting access with limited ticket sales, and ensuring the livestream is only available to watch live, were either mixed or negative. Importantly, for musicians, attenders indicated that they are happy to pay to watch livestreams from artists that have presented other livestreams for free.

Attenders who hadn't watched livestreams felt held back by a lack of shared experience with other attenders, and by not being in the same physical room as the performer. Fortunately those who had watched them either didn't feel these were drawbacks, or had mixed opinions. Attenders were not held back by online access issues. Musicians generally agreed that they were concerned about the use of technology, how interested/engaged the audience would be, what experience they could

provide their audience, whether they could generate enough income for it to be worthwhile, how possible it would be to interact with their audience, and whether they could maintain the interest of non-paying viewers. Comparisons across genres indicated that fewer Jazz musicians were 'prolifically livestreaming' than Folk and Pop musicians.

Both attenders and musicians agreed that livestreaming has a future beyond COVID-19, but musicians were mixed as to whether it would provide them with a viable, additional income stream. Musicians were generally negative about methods for monetizing livestreams, although they expressed a moderate degree of positivity towards the donations model, and to receiving fixed fees from promoters. Both groups agreed that it will be used as a tool for reaching new audiences, such as those from geographical locations that they are yet to perform in, and those who are reluctant (or unable) to visit physical venues. Attenders who hadn't watched livestreams firmly disagreed that they would ever choose to watch a livestream over a concert in a physical venue, however this elicited a wider spread of conflicting opinions from those that had watched them. Musicians firmly agreed that livestreaming should embrace new artistic possibilities made possible by the format instead of replicating performances in physical venues. The likelihood of continuing to watch/perform livestreams post-COVID-19 was split by experience. Attenders who had watched livestreams were likely to continue to, whereas those who hadn't were unlikely. For musicians it was a mixed picture for those that had performed livestreams already, and those who hadn't were unlikely to do so post-COVID-19.

Performers who agreed that livestreams should be free to watch, and that livestreaming will be a helpful addition to musicians working lives in the future, performed more livestreams. This was also the case for musicians who had lost more performance work since the mid-March 2020. Those with deeper concerns about the audience response (interest/engagement/experience) performed fewer.

The number of concerts that attenders watched was predictable on the basis of how many concerts they tended to watch pre-COVID-19, the degree to which they feel connected due to audience's live response and in-the-moment communication with the performer, how positive they were about the effort involved/payment process etc, and the degree to which they agreed that livestreams should be priced lower than physical concerts. People aged 35 and over watched more livestreams (although as the model included only two possible age

categories, the ages responsible for this may require further teasing out), and the those with a greater degree of concern about dissimilarity between livestreams and physical concerts (such as not being in the same physical space, and the lack of interaction/ shared emotional experience) watched fewer. Actually paying for livestreams was predictable by the same variables except that age, and agreeing that livestreams should be priced lower than physical concerts, were no longer predictive. Those that spent more on tickets for

concerts in physical concerts prior to COVID-19 tended to pay for more livestreams. The more that attenders agreed that livestreaming has a future beyond COVID-19, the more livestreams they paid for. The findings of the present quantitative analysis suggest that attending to these audience interests and concerns (in addition to the points raised in the main report) may lead to a) more viewers, and b) more paying viewers, for livestreams.

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