

**Feel Like Dancing: How Observing Synchrony in a Dance Performance Affects  
Belonging, Considering a Moderation of Cultural Background**

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### **Abstract**

In light of a growing body of content on social media that consists of synchronized dance performances, this study assessed the effect of watching a synchronous vs. asynchronous dance performance on feelings of belonging. Moreover, it tested for a moderation of this effect by how collectivistic (vs. individualistic) participant's values are. In an online survey ( $N = 141$ ), participants were assessed in their collectivistic tendencies, and then randomly assigned to watch the video of either a synchronous or asynchronous dance performance. Subsequently, feelings of belonging and the willingness to engage with the video on social media were measured. For the influence of synchrony and collectivism on belonging, no effects were found. However, there are some indications that this was likely due to the limitations of this study. An explanatory analysis of the moderation of collectivism on the effect of synchrony on participant's willingness to like, share, save and comment on the video on social media yielded a significant interaction, suggesting a possible moderation of collectivism on the effect of synchrony on social media behavior. Implications for future research were discussed.

*Keywords:* observing synchrony, belonging, individualism, collectivism, social media, dance

## **Feel Like Dancing: How Observing Synchrony in a Dance Performance Affects Belonging, Considering a Moderation of Cultural Background**

Everyone knows the satisfying feeling of watching a parade, or a perfectly synchronized dance performance. Be it sports, artistic performances, cultural rituals, or in the military, synchrony can be found in many aspects of life and is often used as a stylistic device or to embody unity. But what is it that makes synchronous movement, i.e. when several people move simultaneously with each other (Hove & Risen, 2009), so special? How does it affect us and our relations to others? For example, moving in synchrony can foster connections and solidarity among those that take part, (Good et al., 2017; Hove & Risen, 2009; Koudenburg et al., 2015; Mogan et al., 2017), possibly by blurring boundaries between the self and others (Lumsden et al., 2014; Wiltermuth & Heath, 2009). Further, synchrony can have effects that reach beyond those that participate in it. Van Mourik Broekman et al. (2019) found, that when observing a synchronous dance performance, either live or on screen in a theatre, performers are perceived as more of an entity, whereby feelings of belonging and solidarity in the audience are facilitated. This study wants to assess if the effect of synchrony on belonging extends to watching an online video of a synchronized performance.

Moreover, the moderation of a collectivist (rather than individualist) orientation on this effect will be assessed. Synchrony requires the collective goal of matching one's movement with each other (Reddish et al, 2013), and people from collectivist cultures are much more focused on collective goals, ingroup relations and feelings of unity that are based on similarities within the group, than people from individualist cultures are (Brewer & Yuki, 2007). This salience of the group as a whole and the emphasis on the group performance, rather than on an individual outcome, is something that the concepts of synchrony and collectivism have in common and that encourages the assessment of a possible interaction.

The relevance of investigating these relationships becomes clear when thinking about how interconnected people from different cultures are nowadays via social media, and how they are exposed to each other's content. On online video platforms like YouTube, Instagram, and especially TikTok, synchronized dances make up a considerable part of the content. As these platforms become bigger and more present in most young people's lives, it is important to understand their effects. It would be interesting to see what kind of emotions are elicited by watching these videos and whether reactions to this content differ across the dimensions of culture. Thus, the question to be assessed in this study, is how watching an online video of a synchronous versus asynchronous dance performance affects feelings of belonging with the observed performers, and whether this effect is dependent on the observer's levels of individualism versus collectivism.

### **Synchrony and belonging**

Previous research has already addressed the relationship between participating in synchrony and several aspects that relate to the concept of belonging. Participating in synchronous movement can increase affiliation (Hove & Risen, 2009), foster social bonding (Mogan et al., 2017), and increase feelings of solidarity (Koudenburg et al., 2015). All of these findings suggest that participating in synchrony can indeed strengthen feelings of belonging towards a group. Synchrony can moreover create a bigger overlap in the perception of self and other (Lumsden et al., 2014). Also, Wiltermuth & Heath (2009) argue that participating in synchrony weakens boundaries between the self and others. In fact, they found that when moving and singing in synchrony with others, people showed more subsequent cooperation among group members than when they moved and sang in asynchrony, including cooperative behaviors that were not in the participants' self-interest. They also found that those taking part in synchrony perceived their group as a team more strongly, which in turn partly mediated the effect on cooperation. This shows that synchrony

can increase feelings of togetherness and connection and the cooperation towards those that we move in synchrony with.

Good et al. (2017) presented results that showed the effect of synchrony on cooperation even across intergroup boundaries. In this study, before participating in synchronous movement participants were divided into subgroups of three people. Affiliation to these subgroups was established through a team-building exercise. Subsequently, always two of these subgroups sat together at a table as a collective, and were asked to tap their hand to the rhythm of music they heard over headphones. These collectives were assigned to one of the following conditions: intergroup synchrony, intragroup synchrony, or asynchrony. In the intergroup synchrony condition, all participants in the collective moved to the same rhythm. When being assigned to the intragroup synchrony condition, the two subgroups tapped to a different rhythm. In the asynchrony condition all participants tapped to a different rhythm. Lastly, participants engaged in a game designed to measure cooperation. Cooperation was measured within and across the subgroups, and it was found that participants in the intergroup synchrony condition showed more cooperation towards all other individuals of the collective, than in the intragroup or asynchrony condition. Here, synchrony promoted social categorization with the collective in which synchrony was performed, extending the effect of synchrony on cooperation above and beyond initially established subgroup boundaries. This speaks for the ability of synchrony to unite people and shift social categorizations towards the group that moves in synchrony. As perceiving oneself as being part of a certain group or social category can translate to a sense of belonging toward that group (Koudenburg et al., 2015), this research of Good et al. (2017) supports the idea that synchrony induces processes that can increase belonging towards the group we move in synchrony with.

Furthermore, effects of synchrony cannot only be found when participating in it. It seems that merely observing synchrony can influence perceptions of the observer (Lakens &

Stel, 2011; Au & Lo, 2020). For example, Lakens & Stel (2011) found that observers make psychological inferences about the entitativity of, and rapport among, the members of a group moving in synchrony. In a more recent study, Au & Lo (2020) found that observers of synchrony, or even just of patterned movement, attributed a higher degree of psychological closeness to the synchronized group. These studies show, that synchrony does not only affect performers, but can also affect the perceptions of the observer.

Moreover, there is research that suggests that observation of synchrony does not only affect the observer's perception of the group performing in synchrony, but also the observer's own emotions. Van Mourik Broekman et al. (2019) assessed the effects of watching a dance performance in which dancers either performed in coordination with each other, or individually. Coordinated performances elicited stronger feelings of belonging and solidarity towards the dancers in the observers. This shows that the observation of synchrony cannot only affect how observers perceive the connectedness among a group moving in synchrony, but also their own feelings of belonging towards that group.

### **Collectivism as a moderator**

Individualism versus collectivism is one of the most widely used dimensions to define cultures. While collectivist cultures put more emphasis on their similarity within the group and a dissimilarity with the outgroup, individualist cultures put more emphasis on individuality and how an individual can distinguish themselves from others (Brewer & Yuki, 2007). Interestingly, the concepts of synchrony and collectivism overlap. Moving in synchrony requires harmony, unity, and a focus on the group goal and performance. Individuals are interdependent in their goal of moving in synchrony, and while the individual contribution is important to that goal, the synchronous movement itself does not allow for much individuality. These patterns are similarly found in collectivism, where group goals and harmony within the group are prioritized over individual needs, and individuals are

conceptualized as parts of a group. They are interdependent in reaching their collective goals, and put a large emphasis on being a unity (Brewer & Yuki, 2007). Based on these similarities, collectivist individuals may recognize their values in synchrony, and observing synchrony might impact them more strongly than more individualist individuals.

Incidentally, in countries of more collectivist cultures, like China, Korea or Japan, the concept of what McNeill (1997) calls “muscular bonding” through rhythmic mass movement (i.e. synchrony) is very prevalent, more than in Western, rather individualist cultures. This includes more drill-like choreographies, in schools or factories, but also religious or cultural dances. These collective movements foster solidarity, social cohesion and cooperation (McNeill, 1997). It therefore seems that for collectivist people synchrony might play a more important role than for individualist people, and moreover that in collectivist cultures displays of synchrony can be instrumentalized to foster belonging. In light of these connections, collectivism should be taken into account as a moderating factor when assessing the effect of synchrony on belonging.

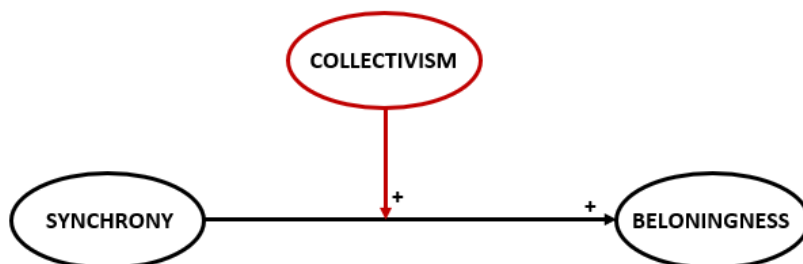
### **Current Research**

To investigate the research question, an online survey will be conducted. Participants will be assessed on their cultural orientations (individualism vs. collectivism). After, they will be randomly assigned to watch a video of a dance performance where dancers will either move in synchrony or in asynchrony. Lastly, participant’s feelings of belonging toward the dance group they just watched will be measured. Based on the background research, I make the following predictions for my research: Participants watching an online video of a mechanically synchronized dance performance will express more belonging to the performing group afterwards, than participants watching an asynchronous performance (Hypothesis 1). Additionally, I hypothesize, that the effect of synchrony on belonging will be moderated by

culture (Figure 1), with the prediction that it is stronger for individuals with more collectivist rather than individualist cultural backgrounds (Hypothesis 2).

**Figure 1**

*Moderation Model*



## Methods

### Exclusion Criteria

Prior to conducting the statistical analysis, of the initial 237 respondents, 96 participants had to be excluded from the data set. The numbers of excluded participants of each criterium do not include any overlap, as each exclusion criterium was applied to the dataset that was left after the previous exclusion criterium was applied. Participants were excluded based on the following criteria: did not finish the questionnaire ( $n = 15$ ), were under the age of 16 ( $n = 1$ ), did not follow the instructions on our attention check question ( $n = 22$ ), found the video offensive ( $n = 4$ ), disturbing ( $n = 7$ ) or inappropriate ( $n = 1$ ), did not watch the entire video ( $n = 10$ ), did not watch it with audio ( $n = 6$ ), or did not perceive the synchrony/asynchrony displayed in their condition ( $n = 30$ ). This last criterium was based on a manipulation check question, in which participants had to react to the statement: “The dancers in the video moved in synchrony.”. In the synchrony condition, 28 participants were removed that did not answer the statement with “somewhat agree” or higher, and two



participants in the asynchrony condition were removed that did not answer the statement with “somewhat disagree” or lower. This left the data set with 141 participants.

## **Participants**

The researchers used convenience sampling methods to gather participants, inviting people via social media, their personal networks, and the University’s participant pool SONA. The final sample consisted of 141 participants, (109 female, 32 male,  $M_{age} = 22.12$ ,  $SD = 5.99$ ). It included people from 24 different nationalities, the three most frequent being Dutch, German, and Bulgarian. Participants were randomly assigned to the two conditions of the independent variable, however due to the exclusion criterion based on the manipulation check, the group size of the asynchrony condition ( $n = 83$ ) was considerably bigger than of the synchrony condition ( $n = 58$ ). Participants were not compensated financially, however, those who took part via the SONA platform, the participant pool of the University of Groningen, were rewarded with 0.5 SONA credits.

## **Materials and Procedure**

Ethical approval was obtained from the Ethical Committee of the University of Groningen. The survey was conducted online via Qualtrics (Qualtrics, Provo, UT), the entire survey can be found in appendix B<sup>1</sup>. Participants were informed about their rights and asked for their consent before being introduced to the study with a welcome text. They were then asked to indicate their nationality, age, and gender.

Before being presented with the manipulation of the independent variable synchrony, participants’ cultural orientation was assessed through the individualism/collectivism scale (Kim & Cho, 2011). This scale consists of 13 items on a bipolar scale. For every item, on

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<sup>1</sup> Other variables that were assessed in the questionnaire but are not relevant for this paper were: the Big Five personality traits, affect, prosocial behavior, and liking. Personality traits were measured by the ten-item personality inventory (TIPI, Gosling et al., 2003), affect by the positive and negative affect schedule (PANAS, Watson et al., 1988), prosocial behavior by a scale from Caprara et al. (2005), and liking by a scale of Rubin (1970) and a single item constructed by Wilthermuth (2012).

each side of the scale a statement was introduced, with the statements on either side contradicting each other. Statements on the left represent a more individualist view, statements on the right a more collectivist view. Participants were asked to indicate which statement they agree more with, with the scale reaching from -3 (toward the left/individualist statement) to +3 (toward the right/collectivist statement). In the data analysis the scale was treated as a 7-point Likert scale, reaching from one to seven. Examples of statements include “people are *independent of social groups*” versus “*defined by social groups*”, and “people should follow *free-will*” versus “*group norms and practices*”. To construct a mean variable for culture, for each individual the average of the 13 items of the individualism/collectivism scale was taken. The single-test reliability analysis showed that this scale was of poor reliability (*Cronbach's*  $\alpha = .582$ ), which will be addressed in the discussion section of this thesis.

After this, participants were randomly assigned to watch a video of either a synchronous, or asynchronous hip-hop dance performance. The videos in both conditions showed a dance group of the same five dancers, in the same setting, with the same music, and same clothes. Both videos were 59 seconds long, participants were asked to watch it only once and without paying attention to anything in particular. After watching the assigned video, participants were presented with a measure for belonging.

Belonging was assessed using items from the Need Threat Scale of Van Beest & Williams (2006). This scale includes five statements to measure the concept of belonging, which were slightly adapted to fit the context of this study. Participants were asked to indicate how strongly they agreed or disagreed with the statements on a seven-point Likert scale, ranging from ‘strongly disagree’ to ‘strongly agree’. Examples of adapted statements include: “I had a feeling that I belonged to the dance crew when watching the video” and “I felt like an outsider while watching the video”. To construct a mean variable for belonging, two items of

the belonging scale were reverse coded, then the average of the five items on belonging was taken for each individual. The single-test reliability analysis for the belonging scale revealed acceptable reliability (*Cronbach's*  $\alpha = .713$ ). Also, an attention check question was included in the questionnaire, asking participants to answer a specific item with “strongly disagree”.

In the following, participant's willingness to promote the video of the dance group on social media was assessed. This was done for exploratory purposes. The measure included five items, an example question would be “If I see the video on social media I would repost it”. Questions were answered on a 7-point Likert scale reaching from “strongly disagree” to “strongly agree”. For the mean social media variable, response scores of the five questions were added together and averaged for each individual, the scale showed good reliability (*Cronbach's*  $\alpha = .854$ ).

Next, three items were introduced to assess whether participants felt the video was inappropriate, or found it offending or disturbing. Considering the cultural diversity of the sample, certain movements that are common to the dance style presented in the video might have been perceived as sensual by some participants. Perceiving the video as offending, disturbing or inappropriate might strongly affect participants' answers, independently of how synchronized the video was. To prevent a distortion of results based on this, these items were added to use as potential exclusion criteria. Subsequently, a manipulation check was included. In this check participants were first asked to indicate whether or not they watched the full video and watched the video with audio. Moreover it was assessed how synchronized participants perceived the dancers in the video to be. This included an item that asked participants to answer the question: “Did the dancers move in synchrony?” with either “yes”, “no”, or “I don't know”<sup>2</sup>. Additionally, participants were asked to indicate how much they

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<sup>2</sup> No participants were excluded based on this question. All participants that were excluded based on the manipulation check, were excluded depending on how strongly they agreed/disagreed with the statement about synchrony, compared with their condition.

agreed with the statement “The dancers in the video moved in synchrony” on a 7-point Likert scale ranging from “strongly disagree” to “strongly agree”.

At the end of the questionnaire, participants were first asked to indicate whether or not they answered the questions genuinely and whether or not their data should be used. Following this, there was an opportunity for participants to ask further questions about the study. Then, participants were debriefed about the true purpose of the research and asked to not discuss this information with other prospective participants. Lastly, a note giving credit to, and promoting, the dance group was included.

## Results

**Table 1**

*Descriptive Statistics*

Variable	Overall	Synchrony Condition	Asynchrony Condition
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Collectivism	4.02 (0.60)	3.99 (0.62)	4.05 (0.58)
Belonging	3.39 (1.09)	3.49 (1.01)	3.32 (1.14)
Social Media	2.56 (1.14)	2.84 (1.26)	2.36 (1.01)

*Note.* This table contains the descriptive statistics of the data including the outliers.

## Main Analysis

The descriptive statistics of the variables belonging, collectivism, and social media can be found in table 1. Seven cases were identified as possible outliers, based on a standardized residual  $> 3$ . Outliers were not excluded as they represent valid cases that passed all exclusion criteria. To test the hypotheses, an analysis of covariance (ANCOVA) was performed, with synchrony and collectivism and its interaction. In a test for the assumption of equality of

variances, the Levene's test yielded a non-significant result,  $F = .968, p = 0.327$ , suggesting that the assumption is met. Looking at the Q-Q plot, which can be found in Figure 2 in appendix A, the data looks approximately normal, indicating that the normality assumption is met here. The test for a main effect of synchrony on belonging when controlling for collectivism yielded a non-significant result,  $F(1, 137) = 0.220, p = .640, \eta_p^2 = .002$ , indicating that there is no effect of synchrony on belonging, even when controlling for collectivism. Similarly, the main effect of collectivism on belonging when controlling for synchrony, was non-significant,  $F(1, 137) = 1.120, p = .292, \eta_p^2 = .008$ . Moreover, the test for an interaction effect of collectivism and synchrony on belonging was non-significant,  $F(1, 137) = .386, p = .535, \eta_p^2 = .003$ , indicating that the effect of synchrony on belonging does not change depending on how individualistic or collectivistic participants' values were<sup>3</sup>.

### Exploratory Analysis

As the dataset included the measurements of the willingness to interact with the videos on social media, an exploratory analysis was performed. Through an ANCOVA, the effect of synchrony on the willingness to like, share, save and comment on the dance video on social media was assessed, including an interaction effect of collectivism and synchrony to test for a possible moderation of this effect by collectivism. The Levene's test for equality of variances was not significant,  $F = 1.636, p = .203$ . The Q-Q plot for this analysis, which can be found in Figure 3 in Appendix A, indicated an approximately normal distribution of standardized residuals for this model. The main effect of synchrony on social media in this analysis was non-significant,  $F(1, 137) = 3.609, p = .060, \eta_p^2 = .026$ , as was the main effect of culture on social media,  $F(1, 137) = 1.479, p = .226, \eta_p^2 = .011$ . However, the interaction between synchrony and collectivism yielded a significant result,  $F(1, 137) = 5.317, p = .023$ , with a

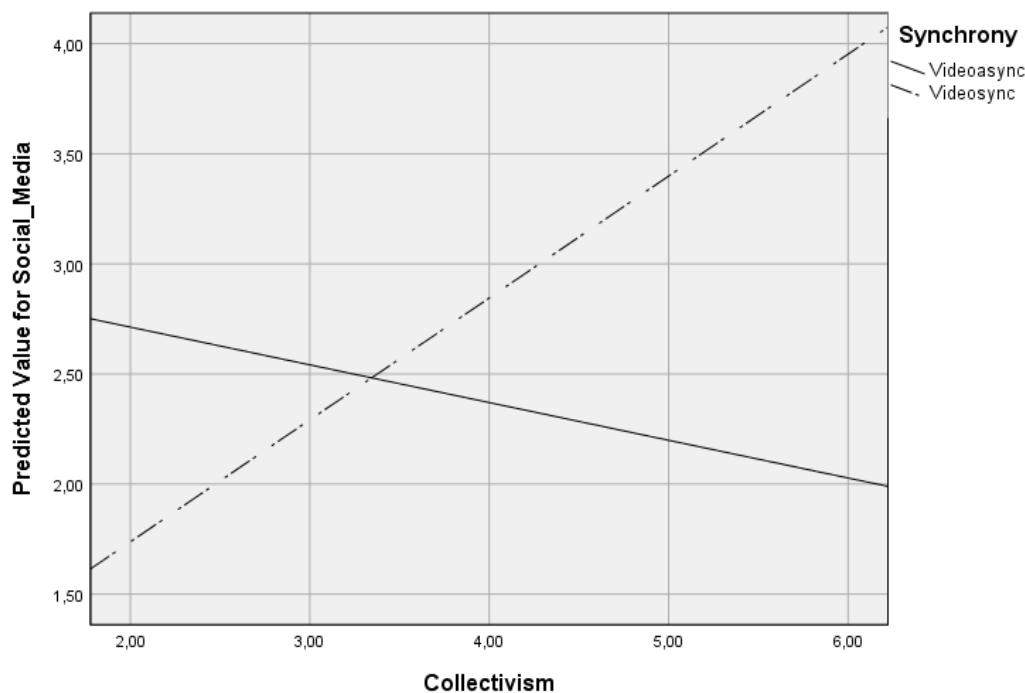
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<sup>3</sup> The ANCOVA was repeated after excluding the seven outliers for belonging from the dataset. Both main effects, for synchrony,  $F(1, 130) = 1.002, p = .319, \eta_p^2 = .008$ , and for collectivism,  $F(1, 130) = 0.144, p = .705, \eta_p^2 = .001$ , and their interaction effect,  $F(1, 130) = 0.722, p = .397, \eta_p^2 = .005$ , remained insignificant.

small effect size,  $\eta_p^2 = .037^4$ . A graph of the interaction can be found in Figure 4. It indicates that collectivism does moderate the effect of synchrony on the participant's willingness to like, share, save and comment on the dance video on social media, however only to a small extent.

**Figure 4**

*Interaction between collectivism and synchrony on social media behavior*



To further investigate this interaction, simple main effects of synchrony on social media with collectivism  $\pm 1$  *SD* from the mean were analysed. The analysis revealed that participants with high collectivism ( $+1$  *SD*) showed more willingness to interact with the video on social media when watching the synchronous video, than when watching the asynchronous video,  $F(1,137) = 11.890$ ,  $p < .001$ ,  $\eta_p^2 = .080$ . For individuals low in

<sup>4</sup> There was one outlier identified in the social media variable, with a standardized residual  $> 3$ . When removing this outlier, main effects for both, synchrony,  $F(1, 136) = 3.538$ ,  $p = .062$ ,  $\eta_p^2 = .025$ , and collectivism,  $F(1, 136) = 1.288$ ,  $p = .258$ ,  $\eta_p^2 = .009$ , remained insignificant. The interaction effect,  $F(1, 136) = 5.069$ ,  $p = .026$ , remained significant with a small effect size,  $\eta_p^2 = .036$ .

collectivism (-1 *SD*) no such effect was found,  $F(1, 137) = 0.042, p = .837, \eta_p^2 = .000$ . This indicates that indeed, collectivism moderated the effect of synchrony on the willingness to like, share, save and comment on the dance video on social media in this sample.

### **Discussion**

In the main analysis of this study, both main effects and the interaction effect for synchrony and collectivism on belonging were not significant. Therefore neither of the hypotheses were supported. However, an exploratory analysis of the effects of synchrony on the willingness to interact with the video on social media, and a moderation of this effect by collectivism, showed a significant interaction. An analysis of simple main effects indicated that more collectivist participants showed a greater willingness to like, share, save, and comment on the synchronous video than the asynchronous video, while no such difference was found for more individualist participants.

There are two possible reasons for the non-significance of the results in the main analysis. The first being that there is no effect of synchrony on belonging, and no moderation of culture. The second being that the effects exist, but due to the context or limitations of this study could not be found. The first hypothesis predicted a positive effect of synchrony on belonging. This effect has been found previously by Van Mourik Broekman et al. (2019), therefore it is crucial to investigate why it was not found in this study, rather than just disregarding the theory. In the research of Van Mourik Broekman et al. (2019), synchrony was introduced through live performances in two of their studies, which is clearly a different experience from watching a video on a screen. However, in the third study participants watched the performance on a theatre-like screen, and effects of synchrony on solidarity with the dancers were still discovered. If watching the video of a performance rather than a live performance is not an obstacle to the effect of synchrony on belonging, it is likely that the reason no effect was found lies in the limitations of the present study, including for example

the online setting, or the manipulation of synchrony. This will be further discussed in the limitations.

The second hypothesis predicted that collectivism would act as a moderator for the effect of synchrony on belonging. The effects of synchrony are likely present across the individualism-collectivism dimension, as they have previously been found in many studies that took place in a context which presumably included mainly participants from individualist cultures (Good et al., 2017; Hove & Risen, 2009; Koudenburg et al., 2015; Wiltermuth & Heath, 2009). However, in this study the effects of synchrony on belonging were expected to be stronger for people high in collectivism than those low in collectivism. This was based on the fact that synchrony is very prominent in the religious and cultural choreographies of collectivist cultures (McNeill, 1997), and the argumentation that synchrony is conceptually related to collectivism. This hypothesis is not supported by this study. As the main effect of synchrony on belonging, which has been found in previous research (Van Mourik Broekman et al., 2019), was non-significant in this study too, it might be that the moderation could simply not be detected because the manipulation of synchrony in this study was not powerful enough. Another reason could be the low reliability of the scale that was used to measure individualism versus collectivism. This will be further discussed in the limitations. While it might also be that the moderation simply does not exist in real life, the results of our exploratory analysis suggest that it might be worth to further investigate a moderation of collectivism on the effects of synchrony.

The most prominent limitation of this study is the online setting in which it was conducted. The experience of watching an online video is clearly very different to a live performance. Additionally there was no control over the quality of the video and audio that participants watched, and in what kind of setting they watched it. Participants may have been distracted by their surroundings which could have disturbed the development of the



connection we expected them to build with the dancers. After all, in the research of Van Mourik Broekman et al. (2019), the effect of synchrony on solidarity could be found in a lab-setting, where there might have been better control over the above-mentioned factors. It might therefore be interesting to replicate their findings in a similarly controlled setting and additionally assess for the moderation of collectivism.

However, it is also important to assess these effects in less controlled and more real-life settings. If it is adjusted from the present set-up, and addresses present limitations, an online study will likely be better able to imitate social media use than a lab-setting. That an online setting could be influential is also suggested by the results of the exploratory analysis. The set-up of this study might have still been able to elicit some kind of liking toward the dancers that would allow for the effect on the willingness to interact with the video on social media, at least for the more collectivist participants that watched the synchronous performance. In the long run, this readiness to interact with the video on social media might even lead to more extensive effects. On social media, people usually follow specific content creators, watching and interacting with their content over the span of several weeks, months, even years. As research into parasocial relationships reveals, following people on social media can create a greater sense of connectedness (Tukachinsky et al. 2020). In a social media context, where belonging has more time and occasion to develop, synchrony might still have an effect on it. Thus, when following a content creator that posts synchronous dance performances, a user might over time show a bigger increase of feelings of belonging toward them than towards a creator that posts asynchronous dance performances. Therefore, designing an online set-up closer to actual social media use could be interesting to further investigate the effects of synchrony.

Another limitation of this study that might explain the non-significance of the results, is the sub-optimal manipulation of synchrony. There were many participants in the synchrony

condition that did not perceive synchrony. This issue was addressed by excluding these participants on the basis of our manipulation check, and the significant effect in the exploratory analysis might suggest that the manipulation was at least somewhat successful. However, the amount of people that had to be excluded shows that the manipulation was far from optimal. Interestingly, when looking at the entire original sample, there were also eight participants that would have been excluded from the asynchrony condition based on not perceiving at least somewhat of asynchrony in the performance. This suggests that several participants possibly perceived some kind of coordination among the dancers. While these too were excluded from the sample, it suggests that there might have been some coordination among the dancers in the asynchrony condition that might have influenced the outcome. After all, Van Mourik Broekman et al. (2019) found that observing coordination can elicit feelings of belonging as well. In the future, this could be addressed by improving the synchrony of the dancers in the synchrony condition, and instating more clear non-coordination or chaos in the asynchrony condition. Moreover, it would be an option to include a manipulation check that asks whether participants perceived coordination among the dancers, and to control for this perceived coordination in the analysis.

One more limitation that should be addressed in regards to the second hypothesis, is the poor reliability that was found for the individualism/collectivism scale. In online questionnaires, it is important to keep the participants' interest so that not too many of them drop out before finishing or get inattentive with their answers. This entails, that it is inapt to use scales with many items, especially when having to incorporate measures for several variables in the questionnaire. The choice of short scales that measure individualism versus collectivism reliably is scarce. The individualism-collectivism scale used in this paper showed adequate reliability before (Kim & Cho, 2011), and was short enough to accommodate the online set-up of this study. As in the end it turned out to show unacceptably low reliability in

the present sample (*Cronbach's*  $\alpha = .582$ ), the use of a longer and more reliable scale should be considered in future research. For example Singelis' self-construal scale (Singelis, 1994), or the horizontal and vertical individualism and collectivism scale (Singelis et al., 1995) could be used. The benefits of a longer scale might outweigh the disadvantages here, especially in the case that a study has to accommodate less variables overall.

Future research should address these limitations. Moreover, confirmatory research for the moderation of collectivism on the relationship between synchrony and social media behavior found in the exploratory analysis, is needed. This could be done in a longitudinal design, where participants are repeatedly exposed to content from the same dancers, to imitate social media use. In this set-up, it would be especially interesting to assess again whether feelings of belonging develop over time, and whether collectivism plays a moderator role in this effect.

### **Conclusion**

While there are clearly effects when participating in synchrony, and likely also when observing synchrony, it is not entirely clear under what circumstances they assert their influence. To understand how and when people connect to each other, or feel that they belong to a group, is essential for understanding human interaction and interrelations. The exploratory findings of this study moreover suggest, that how we interact with content on social media may depend on the content and could differ among individuals. On social media, people from all over the world are exposed to content from all over the world. In case cultural background does affect how we are influenced by, and interact with, certain content, this may be used to manipulate content in a way that it is more appealing to a target group. In the best case, this might offer the opportunity to unite people or to foster prosocial behavior. In the worst case it might be used to create a division between "us" and "them", like is often the case

in propaganda. Therefore it is vital to understand how these effects come about, to protect ourselves and especially young generations when being active on social media.

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## Appendix A

Figure 2

*Q-Q plot for the ANCOVA on belonging*

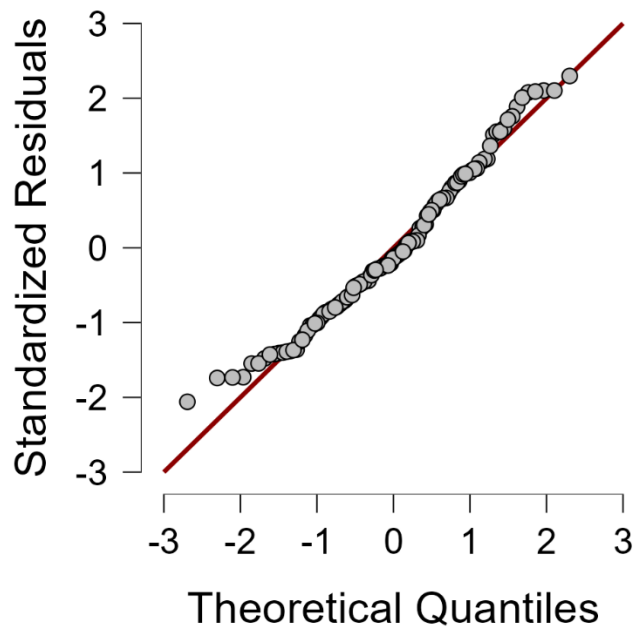
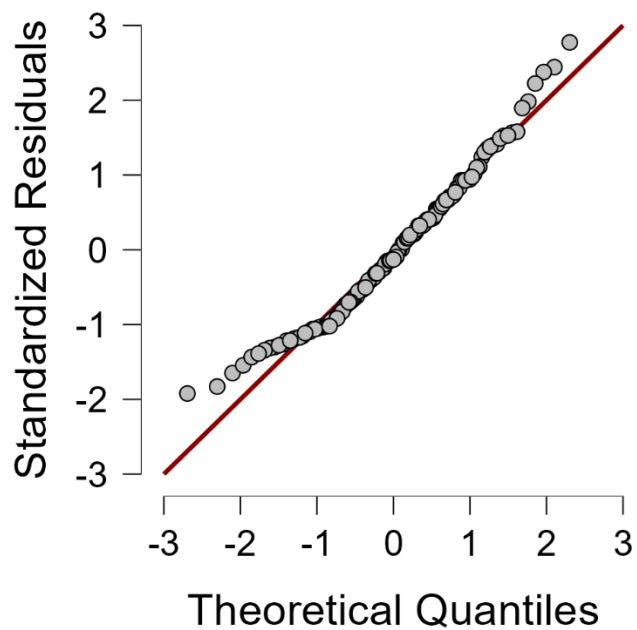


Figure 3

*Q-Q plot for the ANCOVA on social media*





## **Appendix B**

### *The survey as it was displayed to participants in Qualtrics*

#### **Greeting**

Welcome to our study! Before we introduce you to the topic, you will read some general information about participation. Please read it carefully and ask all questions you might have.

#### **Information form**

##### **INFORMATION ABOUT THE RESEARCH**

##### **Feel Like Dancing**

#### **Why do I receive this information?**

You have been invited because we are interested to research how people respond to observing dance. You have been invited through social media via the researchers' personal networks and/or because you are a student at the University of Groningen.

This research is conducted as part of the bachelor thesis by M.N. Genova (student), H.N. Graul (student), O.M. Rofifah (student), T. Simkins (student), E. Tsvetanova (student), and A. van Mourik Broekman (principal investigator, a.van.mourik.broekman@rug.nl).

#### **Do I have to participate in this research?**

Participation in the research is voluntary. However, your consent is needed. Therefore, please read this information carefully. Ask all the questions you might have (to a.van.mourik.broekman@rug.nl), for example if you do not understand something. Only afterwards you decide if you want to participate.

If you decide not to participate, you do not need to explain why, and there will be no negative consequences for you. You have the right to withdraw your participation at all times, including after you have consented to participate in the research.

#### **Why this research?**

In this research we are interested in how you feel after watching a short dance performance.

**What do we ask of you during the research?**

Before the research starts, we will ask for your consent to participate.

Then we will ask you some questions about you and your personality by asking you to indicate to what extent you agree or disagree with certain statements. Following this, you will watch a short clip of a dance performance. Finally, we will ask you some questions about what you thought about the performance and how you feel by asking you to indicate to what extent you agree or disagree with certain statements.

This research will take approximately 10-15 minutes to finish.

**What are the consequences of participation?**

Your participation is entirely voluntary; therefore, no compensation is provided. Your participation is highly appreciated and will help us understand what the social impact is of watching performing art and physical movement.

The dance performance shown in this research does not contain nudity or offensive gestures. However, some of the movements may be considered somewhat explicit. Although we do not expect that this will have negative consequences for most participants, we advise you not to participate if you are sensitive to and/or could be offended by such content.

You may also terminate your participation at any time during the research without any consequences.

**How will we treat your data?**

You will be asked to provide personal data such as age, gender and nationality. The data collected in this research will be used for educational purposes (i.e., a bachelor thesis).

Data will be collected anonymously and will not be traced back to you as an individual. The personal data collected will be age, gender, and nationality. Data on age and nationality will be stored separately from the other data after data collection is completed.

Data will be handled (collected, prepared, analyzed) by the aforementioned researchers. All data will be stored for 10 years. Because data is collected anonymously, we cannot access, rectify or erase individual data after participation.

### What else do you need to know?

You may always ask questions about the research: now, during the research, and after the end of the research. You can do so by emailing the principal investigator (a.van.mourik.broekman@rug.nl).

Do you have questions/concerns about your rights as a research participant or about the conduct of the research? You may also contact the Ethics Committee of the Faculty of Behavioural and Social Sciences of the University of Groningen: ec-bss@rug.nl.

Do you have questions or concerns regarding the handling of your personal data? You may also contact the University of Groningen Data Protection Officer: privacy@rug.nl.

As a research participant, you have the right to a copy of this research information.

### informed consent

#### INFORMED CONSENT

##### Feel Like Dancing

- I have read the information about the research. I have had enough opportunity to ask questions about it.
- I understand what the research is about, what is being asked of me, which consequences participation can have, how my data will be handled, and what my rights as a participant are.
- I understand that participation in the research is voluntary. I myself choose to participate. I can stop participating at any moment. If I stop, I do not need to explain why. Stopping will have no negative consequences for me.

#### Consent to participate in the research:

Yes, I read the research information and consent to participate; this consent is valid until 01-06-2022

*If you do not consent or want to withdraw you can quit the questionnaire now without any consequences.*

## Welcoming Text

### Welcome and thank you for taking part in our study!

We would like to ask you to first answer a few questions or to evaluate a few statements, so we can get to know you. Then, you will see a video of a dance performance and you will be asked to answer questions about what you have seen.

It is very important that you read the questions thoroughly, to ensure that you understand what is asked of you. However, there is no right or wrong answer. Please answer as truthfully and as honestly as possible.

## Demographics

What is your nationality?

How old are you? (please enter a number and do not add a space after)

What is your gender?

- Male
- Female
- Other:
- I don't want to say



I/C

In the next paragraph you will read several statements about how people relate to each other. Each question will include two opposite statements. Please read the statements carefully and indicate which statement you agree more with, and how strongly you agree with it. A higher negative number means you agree more strongly with the statement on the left side, a higher positive number means you agree more strongly with the statement on the right side.

If you are answering this questionnaire on the phone, you might have to put it in landscape/horizontal screen mode to see all of the text.

	-3	-2	-1	0	+1	+2	+3	
People are defined based on the attributes of the individual.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	People are defined based on the attributes of engaged social groups.
People are independent of social groups.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	People are defined by social groups.
Individuals and groups can be separated.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Individuals and groups cannot be separated.
Individual goals are more important.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Group goals are more important.
Individual's behaviors should follow individual goals.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Individual's behaviors should follow group goals.
To achieve group goals, individual interests cannot be sacrificed.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	To achieve group goals, individual interests can be sacrificed.
For group members, individual rights are more important.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	For group members, individual responsibilities are more important.
At work or at play, it is important to win.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	At work or at play, it is important to harmonize.
The source of group success is competition.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	The source of group success is cooperation.
Groups are better with competition.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Groups are better with harmony.
People should follow free-will.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	People should follow group norms and practices.
When you disagree with others, follow your opinion.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	When you disagree with others, follow group decisions.
Within groups, individuality is respected.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Within groups, group uniformity is respected.

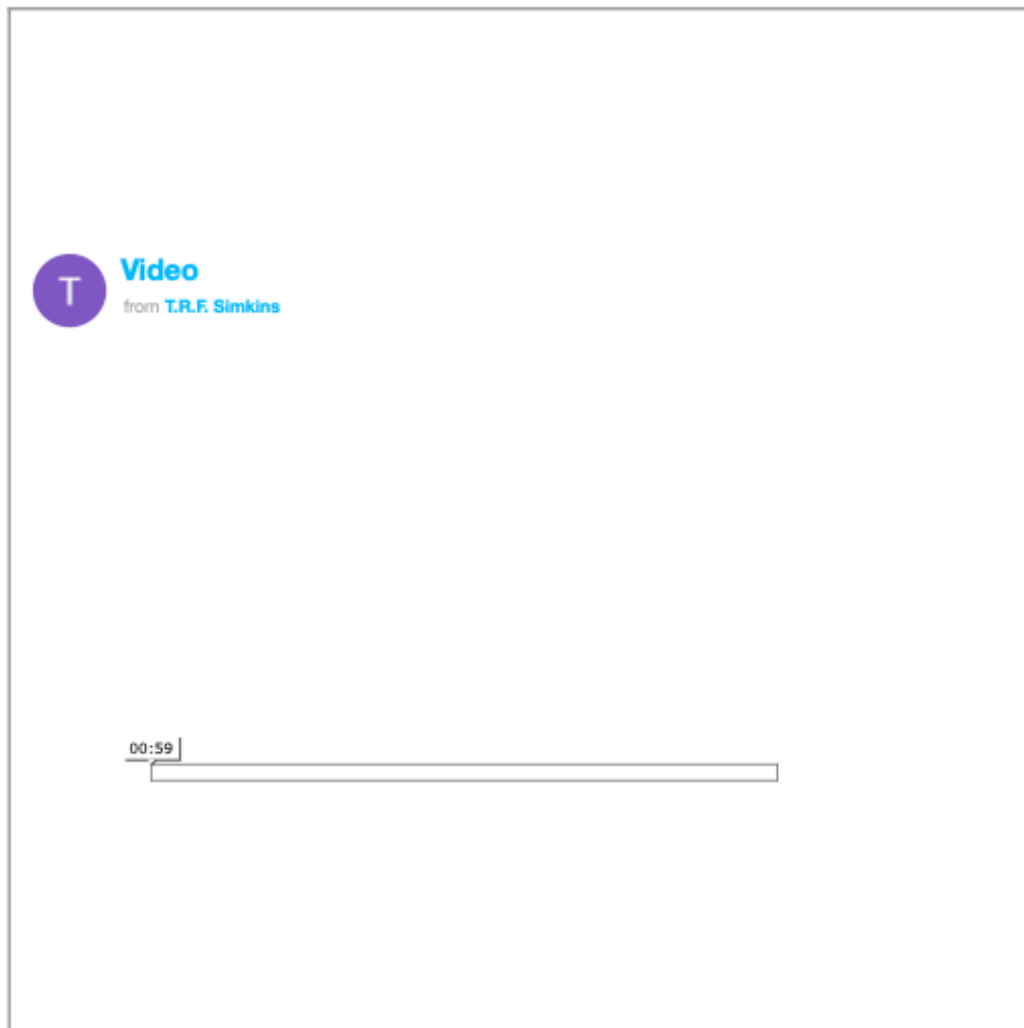
## Video sync

Please watch the following video. You do not have to pay attention to anything in particular, just sit back and enjoy.

If you are on the phone, please make sure to use landscape/horizontal screen mode to see the whole video.

The audio of the video is turned high, so if you are wearing headphones, make sure to turn the audio down a little.

Please make sure your audio is on and please only watch the video once, afterwards press the red button below the video to proceed with the survey.

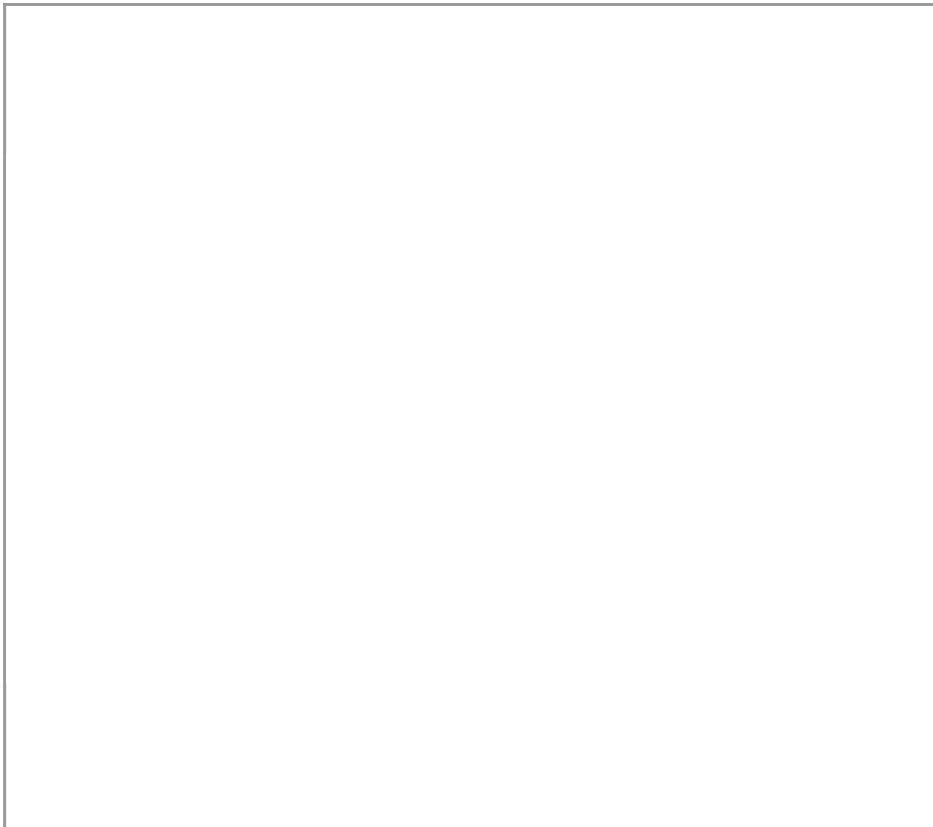


**Video async**

Please watch the following video. You do not have to pay attention to anything in particular, just sit back and enjoy.

If you are on the phone, please make sure to use landscape/horizontal screen mode to see the whole video. The audio of the video is turned high, so if you are wearing headphones, make sure to turn the audio down a little.

Please make sure your audio is on and please only watch the video once, afterwards press the red button below the video to proceed with the survey.





**Affect**

Indicate to what extent you feel the following:

	Not at all	A little	Moderately	Quite a bit	Extremely
Interested	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Distressed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Excited	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Upset	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Strong	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Guilty	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Scared	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Hostile	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Enthusiastic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proud	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Irritable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Alert	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ashamed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Inspired	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Nervous	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Determined	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Attentive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Jittery	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Active	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Afraid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>







## offense

Following you will find a few questions concerning your attitude towards the video. For every statement give an indication of how strongly you agree or disagree.

	Strongly disagree	Disagree	Slightly disagree	Neutral	Slightly agree	Agree	Strongly agree
I felt offended by the video.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt disturbed by the video.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I found the video inappropriate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Manipulation check

We asked you to watch a video of a dance performance. Perhaps there were reasons why you did not watch the whole video. In order to interpret your responses, we need to ensure you actually watched the video. Please answer the following question truthfully. There are no negative consequences if you did not watch the full video.

Were you able to watch the whole video?

- yes, I watched the whole video
- no, I did not watch the video
- I only watched (a) part(s) of the video

Did you watch the video with audio?

- yes, I watched video with audio
- no, I watched video without audio

You watched a video of a dance performance earlier. Did the dancers move in synchrony?

- Yes
- No
- I don't know

Please indicate how much you agree with the following statement.

	Strongly disagree	Disagree	Somewhat disagree	Neither Agree nor Disagree	Somewhat agree	Agree	Strongly agree
The dancers in the video moved in synchrony.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Did you answer the questions genuinely? If you did not, or you see any other reason why we shouldn't be using your data, please select 'Do not use my data'. There will be no consequences for that, it just helps us with the validity of our data.

- You can use my data  
 Do not use my data

### Further Questions

Do you have any further comments?

### Debriefing

#### Thank you for participating in our research.

In this research we were interested to investigate the social impact of observing a dance performance (how connected you feel with the dancers, whether you like them, and whether you support them). What you did not know is that, you either saw the dancers move in synchrony or not. We want to find out whether people respond differently depending on how the dancers coordinate their movement. Furthermore, we will investigate whether this is affected by your personality as well as whether you are more or less individualistic versus collectivistic.

Please do not talk about the true purpose of the study to people who are still going to participate.

If you have any questions about this research, please contact the principal investigator (a.van.mourik.broekman@rug.nl).

**Credit**

As researchers we would also like to say a big thank you to the Wrong Generation Crew for performing for the videos you watched earlier.

The Wrong Generation Crew is a dance crew from Sofia, Bulgaria. If you would like to check them out or support them, you can visit their Instagram channel @wronggenerationofficial; or copy this link:  
<https://www.instagram.com/wronggenerationofficial/>

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