

THE SPATIAL CONSTRUAL OF *TIME* IN INDONESIAN: EVIDENCE FROM LANGUAGE AND GESTURE

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Abstract

This paper presents evidence from language and gesture for the spatial conceptualisation of *TIME* in Indonesian. Linguistic evidence corroborates the dominant patterns of *SPACE-TIME* mapping for deictic times (i.e., future, present/now, and past); Indonesian speakers talk about the future as an event in front of them, while the past is behind them. The spontaneous gestural data reflect and extend the patterns observed in other languages. Forward and backward (i.e., sagittal) gestures tend to accompany future and past expressions respectively. Deictic times can also be construed through the leftward and rightward (i.e., lateral) gestures and the combination of the sagittal and lateral axes, which lack a linguistic analogue. The gesture for sequential-time (i.e., before-after) is more likely to be lateral. Our study contributes to (i) the exploration of universality and variation in the construal of *TIME* in language and gesture, and (ii) the growing interest within Cognitive Linguistics in converging and/or diverging evidence from different methods and data types.

Keywords: Indonesian, gestures, time, space, cognitive linguistics

Abstrak

Makalah ini menyajikan bukti-bukti pemakaian bahasa dan gerak-isyarat (gesture) yang mencerminkan konseptualisasi spasial terhadap konsep WAKTU dalam bahasa Indonesia. Bukti bahasa menunjukkan bahwa kejadian yang belum terjadi berada di DEPAN kita, sedangkan kejadian yang telah terjadi berada di BELAKANG kita. Data gerak-isyarat spontan mendukung bukti-bukti bahasa bahwa masa depan terletak secara spasial di DEPAN penutur dan masa lalu berada di BELAKANG penutur. Data gerak-isyarat juga menunjukkan konseptualisasi yang tidak tercermin dalam bahasa, yaitu konseptualisasi lateral bahwa masa lalu dipahami terletak di sebelah KIRI penutur dan masa depan terletak di sebelah KANAN penutur. Gerak-isyarat yang menggabungkan kedua aksis tersebut juga dominan ditemukan. Tubuh penutur dipahami sebagai jangkar untuk saat ini. Secara luas makalah ini berkontribusi terhadap (i) kajian kesemestaan dan keragaman konseptualisasi metaforis konsep WAKTU dalam bahasa dan gerak-isyarat, dan (ii) tren kajian Linguistik Kognitif yang mulai mengandalkan triangulasi temuan berdasarkan metode dan jenis data berbeda.

Kata kunci: Bahasa Indonesia, gerak-isyarat, waktu, ruang, linguistik kognitif

INTRODUCTION

The conceptualisation of *TIME* has received a lot of attention in cognitive linguistics, and cognitive science in general, as a test case for a broader inquiry of how people think and talk about an abstract domain in terms of another embodied domain (Núñez & Cooperrider, 2013). Previous works have shown that a wide range of languages and cultures construe *TIME* using concepts and vocabularies from the domains of *SPACE* and *MOTION* (Whorf, 1956; Clark, 1973; Traugott, 1978; Lakoff & Johnson, 1980, pp. 41–45, 1999, pp. 137–169; for recent overviews, see Núñez &

Cooperrider, 2013; Sweetser & Gaby, 2017; Gaby & Sweetser, 2017). For example, in English, we could say that (i) we have a *long vacation ahead* of us, (ii) “John left *behind schedule*” (Clark, 1973, p. 50), or (iii) “the *second quarter of 2021 rushed by* us”¹. In these linguistic expressions, we observe the metaphorical usages of vocabularies with primary meaning from the domains of MOTION and SPACE, such as *rush by*, *long*, *ahead*, and *behind*; they are used to talk about aspects of an abstract domain of TIME (underlined in the examples), such as the passage of time, duration (of an event), and the relationship between (i) past, present, and future, or (ii) between two events.

While cross-language, multidisciplinary studies of TIME abound, the metaphorical conceptualisation of TIME in Indonesian has only received scant attention (Casasanto et al., 2004; Prayogi, 2013; Perdana, 2019). Casasanto et al. (2004) conducted cross-linguistic experiments on how duration is conceptualised in English, Greek, Spanish, and Indonesian. Evidence from a non-linguistic task converges with linguistic evidence for the prominent metaphor used to describe duration in each language. Indonesian participants in the experiment show a preference for expressing duration in terms of DISTANCE (e.g., *waktunya panjang* ‘the time is *long*’) over QUANTITY (e.g., *tidak ada banyak waktu lagi* ‘there is not *much time* anymore’) both in language and thought (Casasanto et al., 2004, pp. 188, 190). For the linguistic data, Casasanto et al. (2004, p. 188, Table 1) used Google search to estimate the prominence of the two construals in language based on two phrases, namely *waktu panjang* and *waktu banyak*; they were chosen as they are reported to be the natural choice provided by Indonesian native speakers to express the idea of ‘a long time’ (DISTANCE) and ‘much time’ (QUANTITY) respectively in English. We re-check the frequency of these two patterns in the corpus that we use in this paper (see the DATA AND METHODS) since the alternative to *waktu banyak* ‘*much time*’, namely *banyak waktu* ‘*much time*’, also sounds natural from the native speaker’s intuition of the first and second authors.

In our corpus, we found that *waktu panjang* ‘lit. time *long*’ (DISTANCE) ($N=40$; 85.1%) is indeed significantly more frequent than *waktu banyak* ‘lit time *much*’ (QUANTITY) ($N=7$; 14.9%) ($X^2_{\text{goodness-of-fit}}=23.17$, $df=1$, $p_{\text{two-tailed}} < 0.001$). However, the phrase *waktu banyak* ($N=7$; 5.88%) itself is significantly much less frequent than its alternative *banyak waktu* ‘*much time*’ ($N=112$; 94.1%) ($X^2_{\text{goodness-of-fit}}=92.647$, $df=1$, $p_{\text{two-tailed}} < 0.001$). Given this distributional fact, *banyak waktu* should have been considered more conventional and natural to represent QUANTITY than *waktu banyak*. When compared to the DISTANCE expression *waktu panjang* ($N=40$; 26.3%), the alternative QUANTITY expression *banyak waktu* ($N=112$; 73.7%) then turns out to be significantly more frequent ($X^2_{\text{goodness-of-fit}}=34.105$, $df=1$, $p_{\text{two-tailed}} < 0.001$). These results are incongruent with Casasanto et al.’s linguistic finding suggesting the prominence of DISTANCE over QUANTITY. We instead show that, if the more frequent *banyak waktu* ($N=112$) is chosen over *waktu banyak* ($N=7$) and compared it with *waktu panjang* ($N=40$), or even with the alternative form *panjang waktu* ($N=2$), Indonesian language prefers QUANTITY over DISTANCE. This means that the Indonesian pattern of DISTANCE and QUANTITY metaphors for duration is not similar to English as previously claimed (Casasanto et al., 2004), but more similar to Greek and Spanish.

Prayogi (2013) is another preliminary study on temporal metaphors in Indonesian. He classified the metaphorical linguistic expressions according to the three-way metaphor types proposed by Lakoff and Johnson (1980), namely Structural, Orientational, and Ontological metaphors, but did not discuss the spatial metaphor in relation to broader typological findings, particularly the typology of temporal frames of reference (e.g., Núñez & Sweetser, 2006) (see below); this is where our paper expands Prayogi’s work. Perdana (2019) contrasts the frequency of a selection of motion verbs in expressing the Moving-Time (e.g., *Winter* has *come*) and

Moving-Ego (e.g., We are *approaching the deadline*) metaphors in Indonesian and English corpora, and finds that speakers of both languages strongly prefer the Moving-Time perspective.

This paper builds on and expands these works by reporting the investigation on the co-speech gestures manifesting the conceptualisation of TIME, a gap from the previous works analysing Indonesian. McNeill (2005, p. 39) proposes that “[g]esture can also represent *images of the abstract*” (italics in original). Such representation can take two general kinds: (i) “metaphoric use of form” (e.g., a gesture of holding an object while the meaning of this gesture metaphorically refers to “holding an ‘idea’”); and (ii) “metaphoric use of space” (McNeill, 2005, p. 39), such as the use of space before the speaker. It is the metaphoric use of space that has been largely explored in the cognitive linguistic literature on temporal gestures (Cooperrider et al., 2014). The spontaneous nature of co-speech gesture becomes a valid behavioural ecology to peek into “the imagistic dimension of a speaker’s thought processes” (Cooperrider et al., 2014, p. 1783), such as the spatial construal of TIME. Núñez and Sweetser (2006, p. 401) argue that the investigation of conceptual systems of TIME based on linguistic expressions should be combined with gestural expressions since “[g]estural data provide crucial information unavailable to purely linguistic analysis”. Several studies have discovered that analysing only language data may overlook richer and more dynamic representations of temporal cognition that in some cases depart from and are unattested in the spoken language (Cooperrider et al., 2014, p. 1783; cf. Sullivan & Bui, 2016).

The questions addressed in this study are as follows: (i) what are the range of patterns for the spatiotemporal metaphors in Indonesian language and temporal gestures? (ii) to what extent do they correspond to the patterns established from previous studies? (iii) where do the linguistic and gestural data on the spatial conceptualisation of TIME converge/diverge? With these questions, we aim to add further data from Indonesian to the existing literature on temporal gestures in different languages and contribute to the central area of universality and variation in the metaphorical conceptualisation of TIME. We will cast the discussion of the data in terms of the typology of the temporal frame of reference for the SPACE-TIME mapping (Núñez & Cooperrider, 2013; Sweetser & Gaby, 2017) (see The Typology of SPACE-TIME Mapping sub-section).

OVERVIEW OF THE THEORETICAL FRAMEWORKS

Cognitive Linguistic view of Metaphor

From the Cognitive Linguistic perspective (Lakoff & Johnson, 1980, 1999; Lakoff, 1987, 1993; Johnson, 1987; Kövecses, 2010; Gibbs, 2006), metaphor is viewed as understanding and experiencing one conceptual domain in terms of another conceptual domain (Lakoff & Johnson, 1980, p. 5, 1999, p. 58). The domain that becomes the locus/target of understanding and conceptualisation, such as the domain of TIME, is called the **target domain**; meanwhile, the domain, such as SPACE and MOTION, in terms of which we conceptualise the target domain is called the **source domain**. In the traditional view of metaphor, the target domain corresponds to the **tenor** of the metaphor and the source domain corresponds to the **vehicle** underlying the comparison in the metaphor (Geeraerts, 2010, p. 206).

Typically, the target domain of a metaphor is an abstract domain of subjective experience (e.g., TIME, EMOTION, MIND), meanwhile, the source domain typically comes from a more concrete embodied concept (e.g., MOTION, SPACE, DISTANCE) (Lakoff & Johnson, 1999, p. 45). The source domain is considered more concrete since it arises from every day, sensorimotor and

embodied experiences with the world around us (Lakoff & Johnson, 1980, pp. 56–68, 1999, pp. 45–59; Feldman, 2006, pp. 7–8), such as experiencing ourselves (or observing objects) moving around spaces, or positioning ourselves relative to other objects. These experiences are “concrete” since they “can be observed from the outside” (Lakoff, 2014, p. 5). Meanwhile “[w]hat is not visible is called ‘abstract’” such as non-visible concepts of TIME (Lakoff, 2014, p. 5). Metaphor is most importantly used to reason about the target domain (Lakoff & Johnson, 1999, p. 65), by mapping inferences and conventional mental images of the source domain onto the target domain (Feldman, 2006, pp. 10–11). For instance, one inference about the motion of two objects in sequence in space is that one of the objects is *ahead of* the other, hence moving *earlier* than the other. When this inference is mapped onto TIME, it structures the reasoning of time or event in sequence, such that when an Event 1 is *ahead of* Event 2, Event 1 is in the past (i.e., happening earlier) relative to Event 2 (Núñez & Sweetser, 2006, p. 407; cf. Lakoff & Johnson, 1999, p. 142).

In the INTRODUCTION, we have seen that linguistic expression is one of the manifestations of metaphor in the conceptual system. The metaphorical nature of abstract reasoning manifests not only in language but also in other modalities and artefacts. As for TIME, human civilisations across different periods and cultures have devised different forms of cultural technologies and graphical conventions to reckon, record, and represent our experience with TIME. The omnipresent examples include calendar, hourglass, timelines, clocks, etc. (Núñez & Cooperrider, 2013, p. 5). These technologies manifest human’s spatialisation of TIME. In this paper, we explore the behavioural reflection of the conceptualisation of TIME in spontaneous co-speech gestures, in addition to the linguistic realisation.

The Typology of SPACE-TIME Mapping

Previous research has established that the typology of SPACE-TIME mapping can be divided into two dominant patterns defined by two distinct reference points. The first pattern is called the **Ego-based Reference Point** (hereafter Ego-RP) model and the second is the **Time-based Reference Point** (hereafter Time-RP) model (Núñez et al., 2006; Núñez & Cooperrider, 2013; Núñez & Sweetser, 2006; Sweetser & Gaby, 2017; cf. Moore, 2004). The division corresponds to the distinction between **deictic** (*future-past*) and non-deictic or **sequential times** (e.g., *before-after*): the former is associated with the Ego-RP model while the latter is associated with the Time-RP model (Núñez & Sweetser, 2006; Núñez & Cooperrider, 2013; Sweetser & Gaby, 2017).

The Ego-RP model picks an Ego (typically the speaker) as the reference point or anchor for the present/now, relative to which the past and future are positioned. There are two sub-types of the Ego-RP model. The first sub-type is called the **Ego-RP Moving Ego** (hereafter **Moving Ego**). In this pattern, the Ego is construed as moving along the temporal landscape towards the future. Linguistic examples illustrating this sub-type include “We’re getting *close to* exam time”, “We’ve *left* midterms *behind* us” (Sweetser & Gaby, 2017, p. 628), or “We’re *coming up on* Christmas” (Lakoff & Johnson, 1999, p. 146) (see example (1) for the Indonesian data). These expressions involve the metaphorical mappings of the FRONT space of Ego (i.e., the prototypical direction faced by the Ego when moving) onto the future and of the past construed as residing BEHIND of Ego (Sweetser & Gaby, 2017, p. 628). The motion of the Ego along the linearly arranged locations is mapped on the “passage” of time, and the distance covered by the motion is mapped onto the amount of time passed (Lakoff & Johnson, 1999, p. 146).

The second sub-type of the Ego-RP model is called the **Ego-RP Moving Time** (hereafter **Moving Time**) (Lakoff & Johnson, 1999; Moore, 2004; Sweetser & Gaby, 2017). On the contrary

to the Moving Ego, the Moving Time model construes an Ego as a stationary observer facing the coming of time that has not yet occurred (Sweetser & Gaby, 2017, p. 627); in this sub-type, it is time that is viewed as moving towards the Ego, which anchors the present. Some linguistic examples include “The deadline is *approaching*”, “The summer just *zoomed by*”, “The time for end-of-summer sales *has passed*” (Lakoff & Johnson, 1999, p. 143). The mappings involve FUTURE IS IN FRONT OF EGO, PAST IS BEHIND OF EGO, THE MOTION OF OBJECTS PASSING EGO IS THE PASSAGE OF TIME (Lakoff & Johnson, 1999, p. 142; Sweetser & Gaby, 2017, p. 628).

The non-deictic type of the SPACE-TIME mapping, namely the Time-RP model, does not have the deictic centre of the present as in the Ego-RP model (Moore, 2004, p. 153). The Time-RP model describes a temporal relationship of before-after between two events. For instance, “It is now 20 minutes *ahead of 1 p.m.*”, “Christmas *follows Thanksgiving*” (Núñez & Sweetser, 2006, p. 408). In this model, the two objects are understood as the times; the sequence of the objects reflects the chronological order of the times that is organised and oriented in terms of the FRONT-BACK relationship defined by the direction of motion of the objects. If in the spatial domain an Object A is placed in front of/behind an Object B, then in the temporal domain, Time A happens earlier/later than Time B (Núñez & Sweetser, 2006, p. 407) (cf. Figure 13).

DATA AND METHODS

This paper analyses linguistic and gesture data. The linguistic data were taken from a 16,506,714 word-tokens corpus in the *Indonesian Leipzig Corpora Collection* (ILCC) (Quasthoff & Goldhahn, 2013; cf. Goldhahn et al., 2012; Biemann et al., 2007), namely “ind_newscrawl_2016_1M-sentences.txt”. It is the latest addition in the ILCC when this project started in 2018. To retrieve the metaphorical linguistic expressions about TIME, we firstly generated *n-grams* (i.e., uninterrupted sequences of *n*-words) that, as a starter, centred around three Indonesian TIME words, namely *waktu* ‘time’ (N=19,719), *masa* ‘era; period’ (N=8,136), and *zaman* ‘era; period’ (N=1,103) (Table 1). These words were selected as the starting points given that they are semantically broader than the more specific words referring to ‘year’, ‘month’, ‘day’, ‘hours’, ‘minutes’, ‘seconds’, etc. Given the large size of the corpus, we used R (R Core Team, 2019) and the “quanteda” R package (Benoit et al., 2018) for generating the *n-grams*.

Table 1. Snippet of the Metaphorical N-Grams Database

No	N-Grams Patterns	Types of N-Grams	Frequency of the N-Grams Patterns
1	<i>pada masa</i> ‘at period’	2-gram	576
2	<i>masa mendatang</i> ‘upcoming period; lit. period coming’	2-gram	198
3	<i>beberapa waktu lalu</i> ‘some time ago; lit. several time passing’	3-gram	1,501
4	<i>dalam waktu dekat</i> ‘soon; lit. in time near’	3-gram	1,283
5	<i>seiring dengan perkembangan zaman</i> ‘along with the times; along with the development of the era’	4-gram	6
6	<i>zaman yang semakin maju</i> ‘advancing era; lit. era that increasingly moves forward’	4-gram	4

From the n-grams as well as the full sentences from which the n-grams were extracted, we identified the linguistic expressions instantiating “metaphorical patterns” (Stefanowitsch, 2004, 2006) containing these TIME words. A metaphorical pattern is defined as “a multi-word expression from a given source domain (SD) into which one or more specific lexical item from a given target domain (TD) have been inserted” (Stefanowitsch, 2006, p. 66). **Table 1** provides a few examples of metaphorical patterns containing the TIME words; the source-domain words are boldfaced while the target domain words are underlined. For instance, in *masa mendatang* ‘upcoming period’, the source-domain word *mendatang* ‘upcoming’ is a verbal modifier for the target-domain head noun *masa* ‘time’. In addition to the expressions based on the TIME words, we also investigated the use of spatial nouns *depan* ‘front’ and *belakang* ‘behind’ in temporal context since FRONT and BEHIND concepts have been central in the literature on the spatial conceptualisation of TIME.

The gesture data were taken from five random episodes of the Indonesian talk show *Just Alvin* (<https://video.medcom.id/just-alvin/>). Table 2 presents the list of the talk shows and the URL in which the videos are openly hosted. In total, we investigated three hours thirty-five minutes videos (i.e., 43 minutes per show on average).

Table 2. List of the studied talk shows

Title of the talk show	Duration (in minutes)	URL (last access 29 September 2021)
<i>Golden Voices</i>	00:43:46	https://video.medcom.id/just-alvin/280
<i>Ladies Enigma</i>	00:44:22	https://video.medcom.id/just-alvin/100
<i>Rockstar’s Angels</i>	00:42:31	https://video.medcom.id/just-alvin/20
<i>Menanti Arah</i>	00:41:38	https://video.medcom.id/just-alvin/20
<i>This is what I love to do</i>	00:42:58	https://video.medcom.id/just-alvin

The website provides the videos for each title split into clips. For each clip, we segmented and noted down the hand gestures co-occurring with temporal expressions in the speech stream (Mittelberg, 2007, p. 233). Following Walker & Cooperrider (2016, p. 485), each gesture was coded for (i) handedness (left hand, right hand, or both hands [i.e., bimanual]); (ii) directionality of the gesture stroke that can be lateral (rightward or leftward), sagittal (forward or backward), the combination of sagittal and lateral axes (forward-rightward, forward-leftward, backward-rightward, backward-leftward) or others; and (iii) congruency of the gestures with the time unit.

We determined the congruency of the gestures as follows (Walker & Cooperrider, 2016, p. 485). For the lateral axis, LEFTWARD-PAST and RIGHTWARD-FUTURE gestures were considered as congruent, in line with previous findings in English, Spanish, and Mandarin for the predominance of these mappings along the lateral axis (Núñez & Cooperrider, 2013). For the sagittal axis, the FORWARD-FUTURE and BACKWARD-PAST gestures were considered congruent, given the linguistic evidence for these mappings in Indonesian (see the Linguistic Data sub-section). Finally, the combined-axis gestures were coded as incongruent, singly congruent, or doubly congruent. If the gestures were only congruent for one of the two axes, it was coded as singly congruent. For instance, in talking about the past with the forward-leftward or backward-rightward gestures, only a single component (i.e., leftward, or backward) in these combined-axis gestures is congruent with the PAST, hence, singly congruent. If the gestures’ directionality was congruent for both axes involved in talking about past or future, the gestures were coded as doubly

congruent (e.g., backward-leftward for past or forward-rightward for future). All other cases were considered incongruent. The supplementary materials (gesture annotation and linguistic data, as well as the R codes) are available at <https://doi.org/10.17605/OSF.IO/FJE6K> (Rajeg et al., 2021).

RESULTS AND DISCUSSION

This section is divided into two sub-sections reflecting the two different data types we investigated namely the linguistic and co-speech gesture data.

Linguistic Data

The linguistic data reveal that the two sub-types of the Ego-RP model exist in Indonesian, namely the Moving Ego (1) and the Moving Time (2).

- (1) *Sebagian besar pelajar di Indonesia telah memasuki masa liburan*
 a.part.of big student LOC³ Indonesia PERF enter period holiday
usai menjalani masa sekolah yang panjang.
 finish undergo (lit. walk.on) period school REL long
 ‘The majority of students in Indonesia have *entered* the holiday period after *going through* a long school period.’ (ind_newscrawl_2016_1M:997725)
- (2) *Saya senang sekali ketika masa panen tiba.*
 1SG happy very when period harvest arrive
 ‘I am very happy when the harvest period *arrives*.’ (ind_newscrawl_2016_1M:230825)

The motion components in these sub-types indicate two viewpoints on the progression of time. The Moving Ego pattern construes a person (Ego) as moving along a temporal landscape, as do the students in (1). In contrast, the Moving Time pattern construes time as moving towards a stationary Ego or observer of time (2). Figure 1 below visualises the proportion of the Moving Ego (10%; N=346) and Moving Time (89%; N=2,982) models in the 2-gram data across the three target TIME words. We filtered the patterns using regular expressions capturing the base words for some Indonesian MOTION lexical items referring to ‘pass’, ‘come’, ‘go’, ‘cross’, ‘enter’, ‘exit’, ‘walk on’. The Moving Time model is significantly more frequent than the Moving Ego model in the 2-gram data ($X^2_{\text{goodness-of-fit}}=2087.9$, $df=1$, $p_{\text{two-tailed}} < 0.001$). This result replicates Perdana’s (2019) finding for the primacy of the Moving Time model for Indonesian (as well as English).

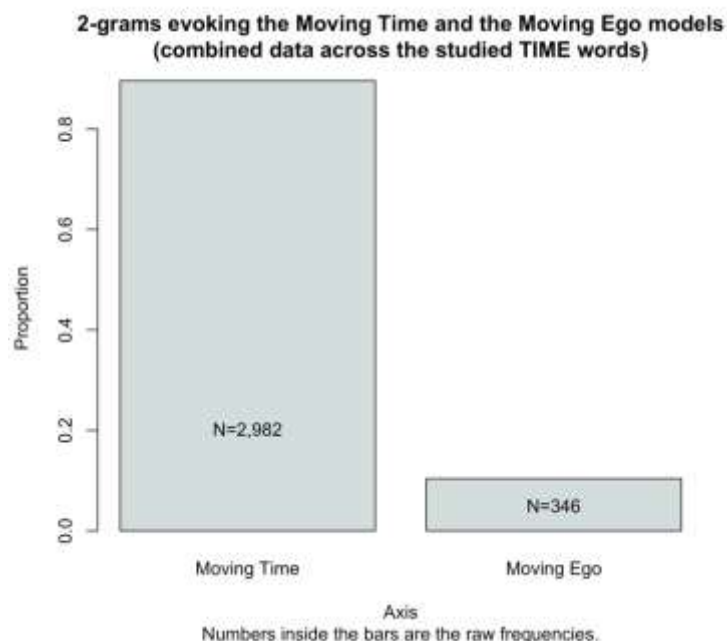


Figure 1. Proportion of the Moving Time and the Moving Ego models in the 2-gram databases

The prevalence of the Moving Time model could be motivated by the lexicalised and conventional metaphorical expressions in Indonesian as the terms for past (*waktu lalu* ‘past, time ago; lit. time passing’ [N=2,027] and *masa lalu* ‘past; lit. period passing’ [N=476]) and future (*masa mendatang* ‘future; lit. period coming’ [N=213]); none of these boldfaced source-domain items ever occur in the Moving Ego model in the 2-gram data. The predominant 2-gram patterns for the Moving Ego are characterised by different forms of motion verbs. The five most frequent ones are *memasuki* ‘enter’ (N=166), *menjalani* ‘undergo; lit. walk on’ (N=87), *melewati* ‘pass sth.’ (N=46), *masuk* ‘enter’ (N=19), and *melalui* ‘pass through’ (N=13).

The Ego-RP model also concerns how deictic times (future and past) are oriented relative to Ego, who acts as the reference point for the present/now. The linguistic expressions used to refer to future and past in Indonesian (see the ensuing discussion) suggest that Indonesian follows the common pattern whereby the space in FRONT of Ego is mapped onto the time or event yet to happen (i.e., future) while the space BEHIND Ego is mapped onto the time or event that had happened (i.e., past) (Núñez & Cooperrider, 2013, p. 226; de la Fuente et al., 2014, p. 1682) (see also some gestural evidence for this in the Co-speech Gesture Data sub-section).

The Indonesian spatial nouns *depan* ‘front’ can occur in different constructions for expressing future from the Ego-RP perspective. The common Indonesian terms referring to future are compounds reflecting static construal (*masa depan* ‘future; lit. period front’) and dynamic ones with motion verbs (*masa mendatang* ‘future; lit. period to come’; *masa yang akan datang* ‘future; lit. period that will come’). *Depan* can co-occur with more specific time nouns in the construction [TIME NOUN + *depan*] expressing ‘next TIME NOUN’, especially with *tahun* ‘year’ (as in *tahun depan* ‘next year; lit. front year’), *bulan* ‘month’ (*bulan depan* ‘next month; lit. front month’), *pekan/minggu* ‘week’ (*pekan/minggu depan* ‘next week; lit. front week’), and names of days (*Senin depan* ‘next Monday; lit. front Monday’).

Another common future construction is when *depan* occurs as a complement of directional preposition *ke* ‘to(wards)’ as in *ke depan* ‘to front’; this prepositional phrase is embedded in

quantified noun phrase headed by time nouns in the construction [QUANT + TIME NOUN + *ke depan*] ‘the *next* QUANT TIME NOUN’. Example (3) illustrates the occurrence of this construction with the main clause marked with the future marker *akan* ‘will; be going to’.

- (3) *dalam waktu [tiga bulan ke depan], para atlet akan dipersiapkan*
 inside time three month to front DEM.PL athlete FUT PASS.prepare.CAUS
 ‘Within the *next* three *months*, the athletes will be prepared’
 (ind_newscrawl_2016_1M:455042)

The fixed preposition phrase *ke depannya* ‘to the front’ can also function as adverbial indicating the future time and co-occur with a desiderative verb, such as *berharap* ‘to hope’ in (4).

- (4) *Ia berharap ke depan-nya juga akan ada kerjasama.*
 3SG hope to front-NML also FUT exist collaboration
 ‘(S)he hopes *in the future* (lit. to[wards] the front) there will be a collaboration.’
 (ind_newscrawl_2016_1M:273782)

With respect to terms for past, Indonesian speakers commonly use the motion verbs *lalu* and *lampau*, both meaning ‘to pass’, as in *masa lalu* and *masa lampau* ‘past; lit. *time passing*’; these compounds evoke the Moving Time pattern for expressing past. The use of *lalu* or *lampau* to indicate past can be construed from two axes for the passing of time, namely, (i) the sagittal axis (from Ego’s front, towards Ego, then residing behind Ego) (Figure 4 and Figure 5), or (ii) the lateral axis (from the left towards Ego and then into the right space, or vice versa) (Figure 10).

Next, *belakang* ‘behind’ cannot be paired with *masa* ‘period’ (i.e., **masa belakang*) to refer to past, in analogy to the term for future, namely *masa depan* ‘future; lit. *period front*’. However, analogous constructions with *lalu* ‘pass’, that is [TIME NOUN + *lalu*] ‘*past/last* TIME NOUN’, are common (e.g., *tahun lalu* ‘*last year*’, *Senin lalu* ‘*last Monday*’). The use of *belakang* in the construction [TIME NOUN + *belakang*] ‘*previous/last/past* TIME NOUN’ is only attested with three types (N=5) co-occurring with more specific temporal nouns (i.e., *tahun/bulan/sepekan belakang* ‘*past year/month/week*’). *Belakang* can evoke the PAST IS BEHIND metaphor in the more complex construction [QUANT + TIME NOUN + *ke belakang*] meaning ‘the *past* QUANT TIME NOUN; lit. QUANT TIME *to behind*’ as in (5), akin to (3).

- (5) *momen paling berat [beberapa tahun ke belakang] ini,*
 moment most heavy several year to behind DEM
tentu saja absennya Arina
 indeed absence.NML NAME
 ‘The most difficult (lit. the heaviest) moment these *past few years* (lit. several *years to behind*) is indeed Arina’s absence’ (ind_newscrawl_2016_1M:362036)

The preposition phrase *ke belakang* ‘to behind’ also combines with verbs of visual perception to describe reflecting on the past relative to the present/now (as in example (6)). The attested verbs include *melihat* ‘to see’, *menoleh* ‘to glance’, and *ditilik* ‘to be seen’.

- (6) *Para ASN perlu diingatkan agar tak lagi menoleh ke belakang*
 DEM.PL civil.servant need PASS.remind so.that NEG again glance to behind
dan hanya menatap masa depan
 and just stare period front
 ‘The Civil Servants need to be reminded so that (they) no longer *look back* (i.e., to the past) and only look to the future (lit. *stare at the front period*)’ (ind_newscrawl_2016_1M:631441)

Belakang can also occur in a morphological construction with *-an* suffixation (i.e., *belakangan*). The suffix *-an* in *belakangan* encodes comparison: while *belakang* means ‘behind’, *belakangan* conveys the idea that something is ‘further behind’ or ‘later (in spatiotemporal motion)’:

- (7) *Penutupan lubang juga berguna agar tikus lain yang datang*
 closing hole also useful so.that mouse other REL come
belakangan, tidak memanfaatkan lubang sarang yang ada
 further.behind NEG make.use.of hole nest REL exist
 ‘The closing of the hole is also useful so that the other mice that come *further behind/after* do not use the existing nest hole’ (ind_newscrawl_2016_1M:668312)

Example (7) suggests that there could have been a mouse (e.g., mouse A) that already came into the hole. The closing of the hole then blocks its use from another mouse (e.g., mouse B), which would come ‘further behind’ (in space), or ‘later’ (in time), than mouse A. Example (8) illustrates the temporal sense of *belakangan* ‘further behind’ expressing ‘later than’ or ‘after’.

- (8) [*tuduhan merugikan negara*]_{later event} *justru muncul belakangan setelah*
 accusation harm state in.fact emerge further.behind after
 [BPKP *diminta (...) melakukan penghitungan*]_{earlier event}
 NAME be.asked do calculation
 ‘The harmful accusation for the state, in fact, emerges *later* (lit. further behind) after BPKP was asked (by the prosecutor) to do calculation’ (ind_newscrawl_2016_1M:41926)

The first event in example (8) is the calculation asked to be done (expressed in the temporal subordinate clause marked with *setelah* ‘after’). Meanwhile, the harmful accusation expressed in the main clause is the later or afterwards event, hence happening ‘further behind’ relative to the first event. This ‘after/later’ sense of *belakangan* in (8) is further highlighted by the temporal adverb *setelah* ‘after’. The ‘later’ sense of *belakangan* in (8) is motivated by the Time-RP model where two events are seen as moving and being arranged in sequence (no Ego as the reference point): the earlier event in (8), namely the calculation, is seen to be in front of the later event, namely the accusation, that is located further behind or *belakangan* than the earlier event.

Belakangan can also have an opposing meaning to the ‘later’, sequential sense, namely of ‘recent past’. This deictic sense of *belakangan* is particularly evoked in the construction [QUANT + TIME NOUN + *belakangan*] ‘past QUANT TIME NOUN’ as in (9). Another common realisation of this construction in the corpus is *beberapa tahun belakangan* ‘past few years’.

- (9) *Hujan deras [beberapa hari belakangan] ini membuat air sungai naik*
 rain intense several day further.behind DEM make water river ascend
 ‘Intense raining these *past* few days increased the water-level of the river’
 (ind_newscrawl_2016_1M:637407)

In the deictic sense of *belakangan*, the reference point is the Ego, and the recent past resides in the nearer behind-space of the Ego; the present is the moment of speech. In other words, the ‘recent past’ sense of *belakangan* is motivated by the Ego-RP model. In contrast, the ‘further behind’ and ‘later’ senses of *belakangan* in (7) (and also in (8) above) are calculated based on sequential relation between two entities (e.g., Mouse A and Mouse B) or events, hence the Time-RP model. This phenomenon demonstrates that two metaphorical models may underlie different senses for a single lexeme, yielding different temporal construal.

Co-speech Gesture Data

In this sub-section, we report quantitative summaries of the gestures produced when talking about deictic (past, present, and future) and sequential times (before-after) in the sample. In the following sub-sections, we discuss some examples of the gestures and provide the URL for each snippet and the time points of the gestures. From the five talk shows (Table 2), we identified (i) 37 (80%) gestures accompanying expressions referring to deictic time, and (ii) 9 (20%) gestures co-occurring with expressions for sequential time ($p_{\text{Exact Binomial test; two-tailed}} < 0.001$). As for handedness, in the deictic-time gestures, 21 (57%) were produced with the right hand, 12 (32%) with the left hand, and 4 (11%) bimanually (i.e., with both hands) ($p_{\text{Exact Multinomial test}} < 0.001$). For the sequential-time gestures, all of them were produced with the right hand. This strong tendency of the righthandedness from the two temporal references corresponds to findings from Walker and Cooperrider (2016) where the majority of the gestures were also produced with the right hand.

In terms of the directionality (see Figure 2), of the 37 gestures for deictic time, 8 (22%) gestures were produced along the sagittal axis (4 backward, 2 forward, 2 downward⁴), 14 (38%) gestures were along the lateral axis (11 leftward, 3 rightward), and 15 (41%) gestures combined the two axes (8 backward-leftward, 4 forward-leftward, 2 forward-rightward, 1 backward-rightward). Overall, more gestures are using the combined and lateral axes than the sagittal one for deictic time ($p_{\text{Exact Multinomial test}} < 0.01$). Furthermore, 6 different speakers contributed to the 15 occurrences of the combined-axis gestures, though most of them (N=8; 53%) come from the host of the talk show (Alvin Adam). Of the 9 gestures accompanying the sequential-time utterances, there are more gestures produced along the lateral axis (N=8; 89%) (5 rightward, 3 leftward) than along the sagittal one (N=1; 11%) ($p_{\text{Exact Binomial test; one-tailed}} < 0.05$) (see Figure 13).

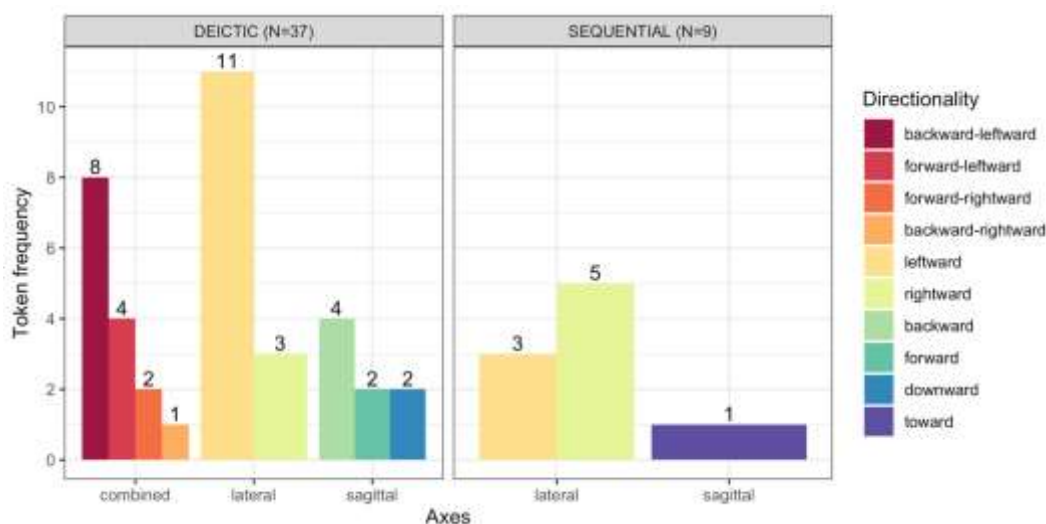


Figure 2. The directionality of the gestures across the three axes for deictic and sequential times

Previous studies on English (Casasanto & Jasmin, 2012, p. 656; Walker & Cooperrider, 2016, pp. 491–492) and Mandarin (Li, 2017, p. 403) have also discovered the higher likelihood of the lateral than the sagittal axis in the spontaneous temporal gestures overall. However, Casasanto & Jasmin (2012, p. 656) further note that the lateral axis is correlated with sequential time while the sagittal axis is correlated with deictic time. The Indonesian sample (i) aligns with Casasanto & Jasmin (2012) inasmuch that there are more sagittal gestures for deictic time ($N=8$) than for sequential time ($N=1$) ($p_{\text{Exact Binomial test; one-tailed}} < 0.05$), but (ii) contrasts with them in that there are still more lateral gestures ($N=22$; 71%) than the sagittal ones ($N=9$; 29%) for both deictic and sequential times ($p_{\text{Exact Binomial test; two-tailed}} < 0.05$). Similar to Walker and Cooperrider (2016), we also found gestures using the combined axes that suggest a possible co-activation of two different source domains for a single temporal reference (e.g., backward-leftward for referring to the PAST; see Figure 5 for the example) (Walker & Cooperrider, 2016).

In terms of congruency, the majority ($N=33$; 89%) of the deictic gestures were congruent (7/8 sagittal, 12/14 lateral, and 14/15 combined-axis gestures were either doubly [$N=9$] or singly [$N=5$] congruent); the lateral gestures in sequential time are all congruent in that the earlier event is placed to the left of the other event. Next, it is interesting to tease out the congruency in the deictic time data for which directions across the three axes the speakers choose once they are construing the past and future. Figure 3 visualises the distribution of the direction for the past and future gestures across the three axes.

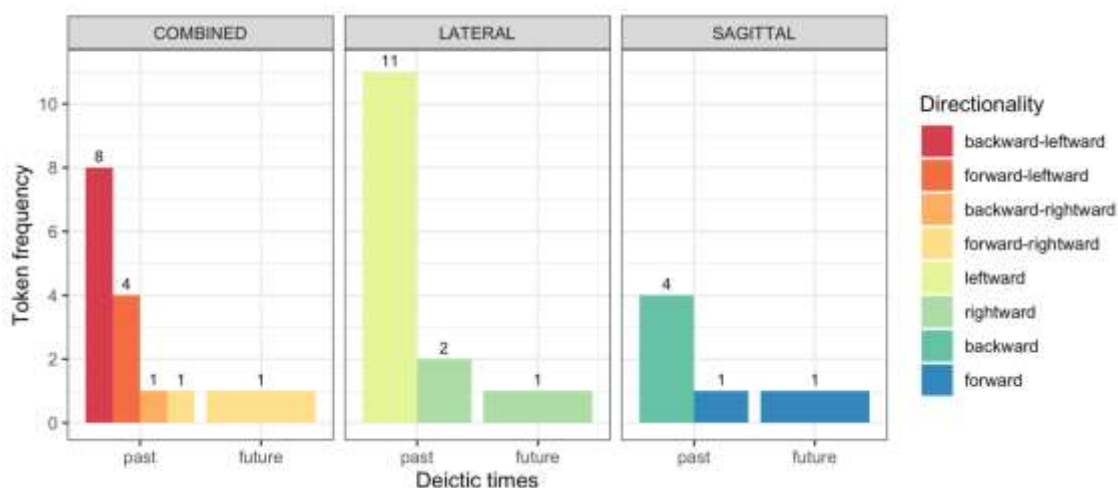


Figure 3. The directionality of the gestures for past and future across the three axes

Firstly, Figure 3 shows that temporal gestures referring to past ($N=32$; 91%) are higher than those for future ($N=3$; 9%). This could be due to the nature of the interview questions that predominantly engage and prompt participants to recall and talk about past events. All future gestures were congruent across the three axes (FUTURE IS FRONT for sagittal; FUTURE IS RIGHT for lateral, and FUTURE IS FORWARD-RIGHTWARD for the combined one).

Focusing now on the past gestures, in the combined axes, past is predominantly construed with backward-leftward gesture ($N=8$; 57%) ($p_{\text{Exact Multinomial test}} < 0.001$), which simultaneously reflect the construals of PAST IS BEHIND (EGO) (Sagittal) and PAST IS LEFT (Lateral) (see below). Seven (88%) of these eight backward-leftward gestures were performed with the right hand. Alvin, the host of the talk show, performed the most ($N=5$; 62%) of these eight backward-leftward gestures all with his right hand.

When construing past along the lateral axis, the speakers were more likely to produce leftward ($N=11$; 85%) than rightward ($N=2$; 15%) gestures ($p_{\text{Exact Binomial test; one-tailed}} < 0.05$). One speaker, namely Fadly, in the *Golden Voice* episode (<https://video.medcom.id/just-alvin/yNLqGYvb-just-alvin-golden-voice-3>) produced the past gestures with the rightward component, once with forward-rightward right-hand gesture (06:05-06:07 minutes) and once with rightward bimanual gesture (06:17-06:18 minutes). Another speaker that produced the rightward gesture for past is Ello when he was referring to (progression to) present with parabolic, right-hand gesture starting from a bit rightward to the centre (<https://video.medcom.id/just-alvin/5b28XnVK-just-alvin-golden-voice-2> at the 02:38-02:40 minutes). The preference of the Indonesian speakers in the sample for construing past onto the space towards their left along the lateral axis dovetails with gestural and experimental evidence from English, Mandarin, and Spanish (see Núñez & Cooperrider, 2013, p. 226, Table 1 and the cited references for these languages therein). On the lateral axis, the progression from past to the present is represented via rightward motion of the hand from the left towards the centre, which is co-located with or in the front space of the speaker.

As for the sagittal axis, backward gesture ($N=4$; 80%) (Figure 4b) is more likely to accompany reference to the past than the forward gesture ($N=1$; 20%) (Figure 7) though, with such a small sample, this difference is not statistically significant ($p_{\text{Exact Binomial test; one-tailed}} > 0.1$). However, if we tally the distribution of the backward directionality in the combined axes with the one in the sagittal ($N=13$) and compare it with the forward direction of past ($N=1$), the backward

gesture is strongly associated with past ($p_{\text{Exact Binomial test; one-tailed}} < 0.001$). This overall tendency offers further evidence from Indonesian sample for the PAST IS BEHIND (EGO) and the FUTURE IS IN FRONT (OF EGO) mappings (see, e.g., Figure 6) found in other languages such as English, French, Mandarin, and Spanish (Núñez & Cooperrider, 2013, p. 226, Table 1; Cooperrider et al., 2014, p. 1782). Gestural data for the PAST IS BEHIND (EGO) mapping also provides converging evidence for the same mapping postulated based on the pattern in linguistic data discussed above, especially in the constructions with the spatial noun *belakang* ‘behind’.

We also identified 8 gestures for utterances about the present, which is anchored with the speaker (e.g., in the space in front of the speakers). Most of these gestures (N=6; 75%) involve lateral movements toward the centre (i.e., the present): 5 gestures (83%) begin from the left-hand side of the speaker and 1 gesture (17%) from the right-hand side. The lateral gestures in the utterances about the present capture the progression of the time from past to the present (Figure 11), and from the present to the future (e.g., Figure 8).

Gesture examples for the Ego-based Reference Point (Ego-RP) model

We begin with examples of gestures evoking the Ego-RP model, which anchors the present/now to the Ego and locate past and future along the sagittal and/or the lateral axes relative to the Ego. As presented in the previous sub-section, we find evidence for gestures along the sagittal (frontward-backward) axis in Indonesian when talking about deictic times (past, present, and future), in addition to gestures combining the two axes. First, consider Figure 4 for the construal of past and present in the sagittal axis with the associated utterances shown in (10).



Figure 4. Downward pointing gesture of the speaker’s right-hand index finger when uttering ‘So, *this year*’ (Figure 4a), and backward-pointing of her right-hand thumb for referring to the 29th of September that has ‘*passed*’ (Figure 4b). This episode was aired in October 2015, thus, at the moment of speech, 29th of September 2015 is in the past (source: <https://video.medcom.id/just-alvin/yNLEQQqb-menanti-arah-5> from 07:04-07:08).

- (10) *Jadi tahun ini*
 so year this
 [Right-hand (RH) index finger points downward to the speaker’s feet, anchoring the present/now (Figure 4a)]
 sebenarnya 29 September
 actually 29 September
 [Repeated downward pointing of the RH index finger (Figure 4a)]
 ...lalu
 passing
 [RH thumb points backward of the speaker (Figure 4b)]
 ‘So, *this year*, actually on the 29 of September *ago* (lit. 29 September that has *passed*)’

Figure 4a indicates that the speaker's now (this year) is co-located with her body, as she makes repeated, downward-pointing gestures towards her feet. When she utters the past expression, 29 September *lalu* 'on the 29th of September that has *passed*' (Figure 4b), the continued gesture of backward pointing of her right-hand thumb suggests that the past date now resides behind the speaker; hence the PAST IS BEHIND construal. Now consider Figure 5 and Figure 6 for the utterances in (11), which capture the FUTURE IS FRONT mapping (Figure 6) and the combined backward-leftward directionality for past (Figure 5).



Figure 5. Right-hand sweeping backward-leftward gesture to the upper left shoulder co-occurring with past expression *tiga tahun yang lalu bikin (konser)* 'three years ago, you held one (concert)' (source: <https://video.medcom.id/just-alvin/VNx63o8k-menanti-arrah-3> from 02:40-02:44)

- (11) *tiga tahun yang lalu bikin (konser)*
three year REL pass make (a concert)

[backward sweeping gesture of the right hand to the upper left shoulder; Figure 5]

nanti 25 *bikin=nya*

later 25 make=3SG

[forward gesture of the right hand; see Figure 6]

'...three years ago (lit. three years that have *passed*) (you) held one (concert), *later* (you would) held 25 (concerts)'

The handshape in Figure 5 differs from Figure 4 but appears to have similar directionality relative to the body of the speaker, namely a backward (over the shoulder) gesture stroke from the front of the body to the upper left hand, with the palm facing backward (see Figure 5c). This adds further evidence for the PAST IS BEHIND mapping in gesture. Then, immediately after the rest position for the past gesture (Figure 5c above), the speaker makes a right-hand forward gesture co-occurring with a deictic expression *nanti* 'later' (in the future relative to the moment of speech) (Figure 6a-c below) in the expression *nanti* 25 *bikinnya* 'later (you would) held 25 (concert)'.



Figure 6. Forward gesture with right-hand open palm shape co-occurring with the deictic expression for future relative to the moment of speech: *nanti* 25 *bikinnya* 'later (you) held 25 (concert)' (source: <https://video.medcom.id/just-alvin/VNx63o8k-menanti-arrah-3> from 02:40-02:44)

Let us now look at one gesture that appears to reflect the construal of PAST IS IN FRONT (OF EGO) (Figure 7). The speaker's gesture occurs when he is talking about watching a legendary Indonesian singer named Broery Marantika singing in the past.



Figure 7. Forward gesture with right-hand open palm shape co-occurring with the deictic expression for past relative to the moment of speech: (*nyanyi*) *yang dulu-dulu* '(singing) that have passed' (source: <https://video.medcom.id/just-alvin/nbwYjZjK-just-alvi> from 03:03-03:07)

- (12) *Aku lihat Broery nyanyi yang XXX yang dulu-dulu*
 1SG see NAME sing REL PAUSE REL past~RED
 [forward gesture]

'I see Broery singing in the *past*...'

The context of the utterance in (12) suggests that the speaker is talking about watching the singing style by Broery *yang dulu-dulu* 'in the past' relative to the speaker's moment of speech, namely the speaker's present. One possibility to interpret this forward gesture for past is to think of this as a Moving Time construal, where past is located further from the speaker's body (but out in front of him) and the present is co-located with the speaker. While this gestural pattern of PAST IS FRONT (OF EGO) is a minority in our Indonesian sample, languages such as Aymara (an Amerindian language) (Núñez & Sweetser, 2006), Vietnamese (Sullivan & Bui, 2016), and Moroccan Arabic (de la Fuente et al., 2014) demonstrate a strong pattern for construing past ahead of the Ego as evidenced from the gesture and experimental data. To sum up, Figure 4 to Figure 7 provide spontaneous, gestural evidence for the construal of deictic time (future and past) along the sagittal and the combined axes, with Ego as the deictic centre, co-located with the present; this is called the "internal perspective" of deictic time (Núñez & Cooperrider, 2013, pp. 222–223).

We also found gestural evidence for the "external perspective" taken by the speaker/Ego in construing deictic time, which "can be likened to the perspective of one observing the moving train from a distance" (Núñez & Cooperrider, 2013, p. 223). The common pattern found cross-linguistically is the lateral construal of deictic time, influenced by writing direction: past is on the left of Ego, present/now is in front of Ego, while future is to the right of Ego. First, consider Figure 8 which combines slightly the forward component, in addition to the lateral one; the associated utterance is shown in (13).



Figure 8. Forward-rightward sweeping gestures co-occurring with future expression using the phrase *ke depan-depannya* 'to the front; i.e., to the future' (source: <https://video.medcom.id/just-alvin/VNx63o8k-menanti-arah-3> from 04:48-04:50)

- (13) ...*sukses* *buat* *ke* *depan-depan-nya* *lagi...*
 ...success for towards front~RED-NML again
 [Forward-rightward sweeping gestures; see Figure 8c-e]

‘... all the best (to you all) in the *upcoming years* (i.e., in the future; lit. to the front-front)’

In Figure 8, the speaker performs repeated rightward hand-gesture. In phase (a), it starts from the space slightly in front of the speaker’s body, with forward-rightward pointing in phase (c) before the fingers point towards the right, palm facing forward in phase (e). Moreover, the speaker’s gaze in Figure 8 is also oriented slightly rightwards from the start and during the stroke of the rightward hand-gesture, with his body leaning slightly to the left. The interlocutors/guests are seated not in the rightward direction where the speaker is looking at when he is producing the gestures (especially in the phases [a] – [d] in Figure 8); the speaker’s gaze shown in phase (e) is directed to the interlocutors. The pairing of gestural and linguistic evidence in (13) reflects the external perspective enacted in construing future time; linguistically, the future is placed in the *depan* ‘front’ space, but gesturally the future is placed in the forward-right-side space.

Figure 9 and Figure 10 below illustrate the mapping of past to the leftward space of the speakers using different hands, left (Figure 9) and right hands (Figure 10). The leftward lateral gesture in Figure 9 is congruent with the utterance mentioning the popular artists in the late 80s and the beginning of the 90s that the speaker worked with as a singer (see (14)). The left hand begins from the rest position on his left lap and move up and leftwards, with open palm facing forward.



Figure 9. Lateral gesture for construing past event/time (source: <https://video.medcom.id/just-alvin/aNreadVK-just-alvin-golden-voice-1> from 04:36-04:38)

- (14) *Artis-artis* *di* *tahun* *80an*
 artis~PL LOC year 80s
 [left-hand leftward gesture; fingers pointing to the left with the palm facing forward]
 ‘Artists in the (year of) 80s’

The speaker in Figure 10 below, when uttering the expressions in (15), produces a swift lateral gesture with her right hand towards the left, particularly congruent with the segment “*10 tahun lalu*” ‘ten years ago’ when she had joined a music competition.



Figure 10. Lateral gesture for construing past event/time; the right hand starts from below and move upwards parabolically towards the left (source: <https://video.medcom.id/just-alvin/zNP2O0xk-this-is-what-i-love-to-do-4> from 06:25-06:26)

- (15) *kayak 10 tahun lalu sudah pernah ikut kompetisi*
 be.like ten year passing already ever join competition
 [leftward parabolic gesture]

‘...it’s like 10 years ago (I) had joined the competition’

In the earlier segment within the same clip (from 02:57-03:02 minutes), the same speaker in Figure 10, Nowela, also produced a similar leftward gesture (with a different handshake) when recalling the past music competition in which she changed her hairstyle.

Next, Figure 11 below captures a lateral, rightward gesture showing a temporal progression from the past to the present; the associated utterance is shown in (16). The context of the utterance and the gesture is that the speaker was explaining the development of, and lesson that we can learn from, Elvis Presley as a musician.



Figure 11. Lateral gesture for temporal progression from the past to the present (source: <https://video.medcom.id/just-alvin/ybDElw0k-just-alvin-golden-voice-4> from 03:47-03:52)

- (16) *Tapi ternyata setelah, setelah kita pelajarin lebih ke sini*
 But it.turns.out after after 1PL.INCL study more to here
 [left-hand starts sweeping twice from left to the centre, which refers to the present (centre; or *ke sini* ‘to here’) from the past (on the left side)]

‘But it turns out that after we take a closer look (on Elvis’s music style) up *to the present* (lit. *to here*)’

In (16), the speaker talks about the characteristic of Elvis Presley as the King of Rock and Roll. He stated, immediately after the utterance in (16), that if we follow Elvis’ music closely up until the present, Elvis was the only singer who always sang songs composed by others (i.e., the speaker tried to make the claim that Elvis’ popularity was not due to his skills in composing song). The relevant gesture here is when the speaker explicitly mentions the present indicated by *sini* ‘here’ while also making sweeping gesture from his left side to the centre to capture the temporal progression to the present, which corresponds with the preposition in the metaphorical pattern *ke sini* ‘to here; to the present’. Figure 11 then exemplifies the PAST IS LEFT and PRESENT IS HERE mappings.

Gesture examples for the Time-based Reference Point (Time-RP) model

The Time-RP model construes one event in relation to another event in terms of “sequentially arrayed objects moving in space” (Núñez & Sweetser, 2006, p. 407), excluding the Ego as the primary reference point. That is, Time-RP only captures ‘earlier than’ and ‘later than’ relationships, not future and past (Núñez et al., 2006, p. 137). Some linguistic examples from English include “Christmas follows Thanksgiving”, “Greenwich Mean Time is lagging behind the scientific standard time”, and “It is now 20 minutes ahead of 1 p.m.” (all examples from Núñez & Sweetser, 2006, p. 408). The English words *before* and *after* used in describing the ‘earlier/later than’ relationship has a spatial origin, etymologically meaning ‘in front of’ and ‘behind’ respectively (e.g., “the dinner is after the plenary talk”, that is the dinner is ‘later than’ or ‘behind’ the plenary talk in the temporal order, where ‘front’ reflects the direction of motion).

Indonesian has two temporal, non-metaphorical words commonly used to convey the before-after relationship, namely *sebelum* ‘before’ (derived from *belum* ‘not yet to happen’) and *sesudah* ‘after’ (derived from *sudah* ‘already’ indicating a perfective aspect in Indonesian). Figure 12 illustrates the lateral gesture taken by the speaker when describing two events (i.e., music eras) using *sebelum* ‘before’ and *sesudah* ‘after’; the associated utterance is shown in (17).

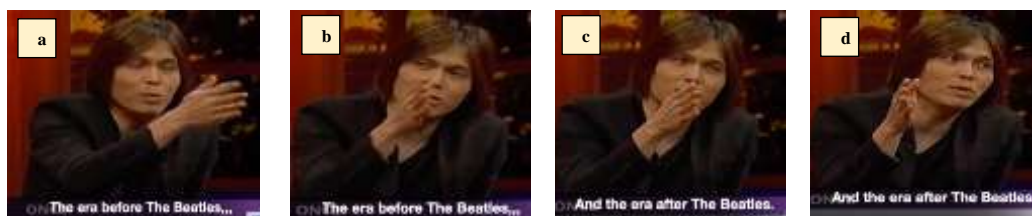


Figure 12. Lateral gestures in construing sequential time (source: <https://video.medcom.id/just-alvin/ybDElw0k-just-alvin-golden-voice-4> from 07:32-07:36)

- (17) Ada dua era, era *sebelum* Beatles
 exist two era era before Beatles
 [right-hand swiping from left to the space in front of the body (Figure 12a-b)]
 dan era *sesudah* Beatles.
 and era after Beatles
 [right-hand rests at the centre, namely the Beatles era (Figure 12c)]
 [then slight swipe to the right (Figure 12d) from the Beatles reference point]
 ‘There are two eras: the era *before* The Beatles and the era *after* The Beatles.’

In this segment, the speaker contrasts two eras of music styles/genres; The Beatles era is used as the reference, mid-point in relation to the other two eras occurring before and after The Beatles respectively. When he points out the era before The Beatles, he moved his right hand leftward (Figure 12a) and when he refers to the era after The Beatles, he moved his right hand rightward (from the reference point of The Beatles) (Figure 12d). Such lateral construal for the sequence and “position” of events (relative to one another) is maintained by the speaker’s gesture in his remaining utterance (from 07:36 – 07:54 minutes; see also Figure 13) when discussing these two music eras in relation to The Beatles. This gesture reflects the spatial, imagistic dimension of temporal concept, especially when talking about sequential (rather than deictic) time, despite the absence of any corresponding metaphorical linguistic expressions for lateral axis in Indonesian (i.e., *kiri* ‘left’ and *kanan* ‘right’) to describe sequential time.

There is one instance of gesture along the sagittal axis in the sample, shown in the lower panel of Figure 13 below. The preceding lateral gesture snippet is also included in the upper panel of Figure 13. The utterance in (18)a accompanies the gesture in the upper panel (Figure 13a-d) while the utterance in (18)b accompanies the snippet in the lower panel (Figure 13e-h).



Figure 13. Gestures along the lateral (upper panel) and sagittal (lower panel) axes for sequential times (source: <https://video.medcom.id/just-alvin/ybDElw0k-just-alvin-golden-voice-4> from 08:11-08:16)

- (18) a *Nah, setelah itu* [“*itu*” here refers to The Beatles era]
 INTERJ after DEM
 [the right-hand moves parabolically rightward from the centre (Figure 13a-d)]
- b *lalu, generasi berikutnya pikir, (...) gue juga bisa*
 afterwards generation next think, 1SG also can
 [the right-hand makes a circle while moving toward the speaker (Figure 13e-h)]
- ‘Now, *after* that (i.e., The Beatles era), then the *next* generation thought they also can (be like The Beatles, namely composing and singing their own songs)’

The rightward gesture in Figure 13a-d construes two sequential events (events *after* The Beatles era and The Beatles era itself, which is the reference point). The post-Beatles era is understood to be to its right as in Figure 12. The speaker then gestures along the sagittal axis, with the speaker’s right-hand moving toward him as it forms a circle (Figure 13e-h). This gesture reflects the Moving Time perspective for the Time-RP model in construing the *next* or *later* generation (18)b after The Beatles. In this perspective, the earlier generation (i.e., The Beatles) and the next one is construed to be a sequence of moving objects: the earlier generation is in front/ahead of the later/next (post-Beatles) one in the direction of motion (Núñez & Sweetser, 2006, pp. 407–408).

The gestural evidence in Figure 13e-h reveals the dynamic construal of the Time-RP model for sequential time in that the post-Beatles generations metaphorically *follow* The Beatles. This seems to be in harmony semantically with the sequential term used in (18), namely *berikutnya* ‘next’, which is derived from the motion verb root *ikut* that can mean ‘follow; come/go along with; join’. Given the gestural data, *generasi berikutnya* can also mean the ‘*following* generation’ (after The Beatles). The linguistic evidence in (18) and its accompanying gesture demonstrate that the sequential relationship between events/time periods can be construed dynamically in Indonesian using the Moving Time metaphor, which, as argued by Núñez and Sweetser (2006, p.

408), is the predominant pattern for the Time-RP in English. Further study is needed to explore how prominent this dynamic construal of the Time-RP model is in Indonesian.

CONCLUSION

This paper has presented evidence for the spatial construal of TIME in Indonesian following the typology of temporal frame of reference. We are the first to expand previous works on the spatial conceptualisation of TIME in Indonesian by providing evidence from spontaneous co-speech gestures. We find that the sagittal and lateral axes, and the combination of the two, were exploited in construing deictic times through gesture. For sequential times, the gesture strokes were predominantly lateral, with the earlier event is more likely to be placed to the left of the later event. Our study also offers further supports for the mapping of past onto the LEFTWARD side in the gestural space of the speaker along the lateral axis, the mapping that has been reported in previous works on different languages, such as English, French, Spanish, and Mandarin. Meanwhile, the linguistic data for the SPACE-TIME mappings in Indonesian are restricted to the sagittal axis (as is cross-linguistically common). The linguistic and gestural evidence suggest that, in Indonesian, future is talked about and construed as if it resides in front of the Ego, which in turn anchors the present/now; past is talked about and construed as if it resides in the space behind the Ego. Through the consideration of gesture data, we provide behavioural, non-linguistic evidence for the psychological reality of the construal of time in terms of space.

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¹ <https://www.michaelmanagement.com/blog/mmc/monthly-course-line-up-june-2021> (last access: 12 November 2021). In these English examples, the authors of this paper give the boldface, underline, and italics.

² Throughout this paper, the letter “N” as in “N=40” refers to the frequency of occurrences for an item, which is also known in corpus linguistics as the token frequency of the item.

³ These are the abbreviations used in the interlinear glossing of the examples: 1 ‘first person’, 3 ‘third person’, CAUS ‘causative’, DEM ‘demonstrative’, FUT ‘future marker’, INCL ‘inclusive’, INTERJ ‘interjection’, LOC ‘locative’, NAME ‘proper name’, NEG ‘negation marker’, NML ‘nominaliser’, PASS ‘passive voice’, PAUS ‘pause’, PERF ‘perfective aspect marker’, PL ‘plural’, RED ‘reduplicated element’, REL ‘relativiser’, SG ‘singular’.

⁴ The ‘downward’ direction co-occurs with the expression of NOW/PRESENT immediately followed by ‘backward’ gesture (sagittal axis) referring to the PAST. Therefore, this ‘downward’ direction is counted into the sagittal axis.