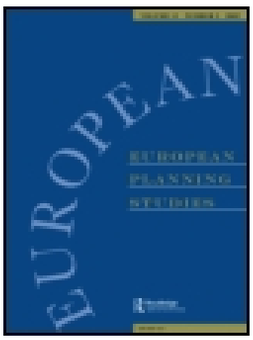

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Climate adaptation on the crossroads of multiple boundaries. Managing boundaries in a complex programme context

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ABSTRACT

Programme management is increasingly used in The Netherlands to realize more integrated regional development, where different sectoral policy objectives are combined. To understand how integration of different objectives is realized in programme management approaches, it is important to have in depth knowledge on how actors manage social, cognitive and physical boundaries. Therefore, this article analyses how actors manage boundaries in a regional integrative programme. Within this case we focus on two integration attempts: one which has succeeded relatively well and one which was less successful. The analysis shows the importance of boundary spanning actions, such as jointly working on strategy documents, organizing events where actors can formally and informally interact, and the activities of a political change agent. Adding to previous insights, we find four additional explanations for successful integration which shed new light on how boundaries can be best managed in future programmatic approaches: the influence of contextual factors on boundary management and its success, the need to address both the social and cognitive dimension of boundaries, the need to make the programme attractive for the actors governing the issues it wants to integrate with, and the role of boundary drawing to create an understanding and respect for boundaries.

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1. Introduction

Programme management is increasingly used to realize more integrated and multifunctional regional development, where different sectoral policy objectives are combined e.g. nature conservation, regional economic development, water management (cf. Buijs, 2018; Busscher, 2014). Examples are the Dutch Room for the River programme (Herk, Rijke, Zevenbergen, Ashley, & Besseling, 2015) and Bluebelt Programme in New York (https://www1.nyc.gov/site/dep/water/the-bluebelt-program.page) that combine flood protection with ecological aims, the Dutch Deltaprogramme on climate adaptation (Van Buuren, Teisman, Verkerk, & Elderling, 2014), the Inter-administrative Program

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Vital Countryside on integrated and sustainable regional rural development (www.werkplaatsvitaalplatteland.nl), or green infrastructure programmes that combine green space, urban development and climate adaptation such as the Programme for Promoting Urban Green Infrastructures in Barcelona. As many organizations past decades started organizing their work largely through 'projects' and using project management, this led to a need to coordinate between different projects, use resources effectively, and work on more strategic goals, resulting in the rise of programmes (Pellegrinelli, 2011). In the context of regional development, programmes are not just about coordinating across projects, but also across different autonomous project organizations working side by side in a larger territorial system (Van Buuren, Buijs, & Teisman, 2010). Programme management is seen as an approach that can help to achieve sustainable, coherent and integral regional development by developing a consistent and a shared focus around a programme among highly different yet interconnected issues and projects that need to be realized simultaneously, but which are often governed by different actors and organizations (ibid). However, we know from previous research that such integrative initiatives, involving a multitude of stakeholders, interests and perspectives, are hard to achieve (Degeling, 1995; Derkzen, Bock, & Wiskerke, 2009; Van Broekhoven & Vernay, 2018). Although integrative initiatives often see wide support at the starting phase, their complexity causes that only some endeavours are successful (O'Farrell & Anderson, 2010; Van Broekhoven & Vernay, 2018).

To understand how integration of different issues and projects is realized in programme management approaches, it is important to address how actors manage boundaries (Lehtonen & Martinsuo, 2009; Van Broekhoven, Boons, Van Buuren, & Teisman, 2015). Integration requires actors to work across different boundaries; social boundaries between groups of people such as water managers, nature conservationist and farmers; cognitive boundaries between perspectives, ways of working, knowledge and language; and physical boundaries in physical objects and geographical jurisdictions (Van Broekhoven et al., 2015). Actors participating in integrative programmes try to influence the multiple boundaries they experience. They try to change or bridge boundaries that constrain them, and construct and maintain boundaries that enable them to pursue their goals, keep out external interferences, or divide tasks and responsibilities (ibid).

The question how actors can deal with boundaries in integrative and multifunctional processes has recently gained attention in spatial planning (Bressers, 2010; Opdam, Westerink, Vos, & Vries, 2015; Van Broekhoven et al., 2015; Westerink, 2016; Westerink, Lagendijk, Dühr, Jagt, & Kempenaar, 2013). However, little is known on how actors can best manage boundaries specifically in programmatic approaches for integrated regional development, in contrast to a growing body of literature on how actors manage boundaries in the context of (multifunctional) projects (Van Broekhoven & Boons, in review; Van Broekhoven et al., 2015; Westerink, Opdam, van Rooij, & Steingröver, 2017). As scholars emphasize the differences between programmes and projects, and state that programmes require a different type of management to succeed (Lycett, Rassau, & Danson, 2004; Pellegrinelli, 2011; Pellegrinelli, Partington, Hemingway, Mohdzain, & Shah, 2007), we can also expect differences in the type of boundary management between programmes and projects that contribute to success. For example, rather than emphasizing strict boundaries around the project and protecting it from interferences from outside that is often

seen in projects, having strict boundaries is in conflict with the idea that programmes are about continuously establishing connections between multiple projects and issues (Lycett et al., 2004). In order to bring together different goals and interest and involve different stakeholders, boundaries between the programme and its environment need to be continuously shaped (Pellegrinelli et al., 2007). This suggests boundaries should not be defined too strict and static.

In this paper we address the following research question: *How do actors manage boundaries over time in an integrative regional programme, how do contextual factors shape how boundaries are managed, and what does this tells us about the kind of boundary management that helps to realize integration in programme management approaches?* We address this question with a longitudinal case study of a regional collaborative programme on climate robust water supply and spatial planning in The Netherlands: the Deltaplan Hoge Zandgronden (Deltaplan High Sandy Soils, DHZ). Within the case we focus on two integration attempts: one which has anchored relatively and one which was less successful. This enables us to explore why boundary management at the one integration attempt was more successful than at the other and what contextual factors shaped boundary management.

2. Conceptual framework

2.1. Programme versus project management for integrated regional development

Programme management can be described as an integrative management approach to coordinate multiple projects, related actors and project management activities, and realize synergetic benefits that could not be obtained separately. Several scholars argue programmes fundamentally differ from projects as they build on different assumptions and principles, and that their management requires different frameworks and tools (Lycett et al., 2004; Pellegrinelli, 2011; Thiry, 2004). Project and programme management differ in at least three respects. Firstly, whilst projects have a relatively clear set of goals and tasks, and a beginning and end, programmes are emergent and constantly shaped and reshaped in terms of contents, processes and structures, in order to bring together different goals and interest, make progress and involve different stakeholders (Pellegrinelli et al., 2007). Programme managers therefore need to be more aware of and responsive to external changes and changes in strategic goals than project managers, and programmes need a more flexible type of management that accommodates for complexity, ambiguity and risks in their environment (ibid). Secondly, whilst projects are often assumed to have a linear life-cycle, programmes develop incrementally in order to deal with external change (Lycett et al., 2004). Their management therefore is about both planning and coping (Van Buuren, Buijs, et al., 2010; Pellegrinelli et al., 2007). Van Buuren, Buijs, et al. (2010) argue programme management in practise is often a hybrid between a planned or top-down implemented management tool and an emerging strategy shaped and given meaning by the strategies and interventions of participating actors. Thirdly, as a result of the above, programmes are significantly shaped by the context in which they take place, and programme management efforts are contextually bound (Lycett et al., 2004; Pellegrinelli et al., 2007).

2.2. Managing boundaries in programmes

To understand how integration of different issues, values and projects is realized in programme management approaches, it is important to address how actors manage boundaries. Boundaries are in essence sites of difference—ways of differentiating something from what it is not (Abbott, 1995; Hernes, 2004). We view boundaries as socially constructed. They are enacted in interactions where they are made explicit, are shaped, enforced, or form a matter of contention (Van Broekhoven et al., 2015). Following Kerosuo (2006, p. 4), we define boundaries as temporary stabilized

> distinctions and differences between and within activity systems that are created and agreed on by groups and individual actors over a long period of time while they are involved in those activities. These distinctions and differences can be categorisations of material objects, people and practices.

In this article we aim to contribute to our understanding of integration in programmes by studying the construction and reconstruction of boundaries: i.e. how boundaries are spanned, drawn, contested, defended and negotiated in the integrative processes. Previous studies provide valuable insights on how boundary spanners can facilitate collaboration across boundaries (e.g. Klerkx, Aarts, & Leeuwis, 2010; Williams, 2002). However, integration is complicated by the need or desire to construct and maintain boundaries (Van Broekhoven et al., 2015). As boundaries have important social functions, actors actively construct and maintain them (Hernes, 2003; Lamont & Molnár, 2002). Moreover, the literature on boundaries draws attention to how boundaries as social constructs are constantly constructed, negotiated, and evolved when actors interact.

To study the (re)construction of boundaries we build forth on a framework developed by Van Broekhoven et al. (2015). We apply this to the context of complex programmes. Moreover, we develop this approach further by adding a focus on the role of contextual factors. As discussed in sector 2.1, programmes are significantly (and more than projects) shaped by the context in which they take place. Building forth upon Van Broekhoven et al. (2015) we study how actors manage boundaries by reconstructing boundary actions, defined as: '*A recurring set of articulations, actions, and interactions that shape a demarcation, taking place over a longer period of time*' (Van Broekhoven et al., 2015, p. 5). We assume that how actors manage boundaries (i.e. perform boundary actions) in programmes affects the extent to which they are able to develop integration. To identify and study actors' boundary actions, we specify three main types of actions through which actors manage boundaries:

(1) Spanning boundaries by connecting people, processes and ideas across boundaries, in order to e.g. coordinate practices or exchange information. Spanning facilitates flow of e.g. information, knowledge and resources across a boundary without challenging its relevance or place. We distinguish actions that span boundaries through developing coordination structures (e.g. project groups) and through developing more dense relations. This can be facilitated by so-called boundary spanners i.e. people or organizations that act as intermediaries, identify needs and facilitate shared problem perceptions and solutions by communicating and building relations (Williams, 2002), and boundary objects i.e. objects that can serve as means of translation and basis for coordination between actors (Star & Griesemer, 1989). In programmes,

permeability of programme boundaries is often emphasized over the benefits of demarcation and the focus on emphasizing strict boundaries and protecting the project from interferences from outside that is often seen in projects (Lycett et al., 2004). Boundaries need to be bridged in order to coordinate and connect different projects and issues, an important aim in programmes. We can hence expect boundary spanning between the programme and its context to be an important boundary action.

(2) Drawing or defending boundaries, in order to e.g. protect something (e.g. interests, plans, established ways of working) from influences from outside, enable successful action within the bounded unit, divide tasks, or demarcate which problems and solutions are included. Drawing or defending boundaries is often seen as problematic for cooperation and constraining the capacity to integrate (Degeling, 1995; Derkzen et al., 2009). However, studies have also found drawing boundaries in integrative work can be useful to keep complexity manageable and divide tasks (Hernes, 2003; Van Broekhoven et al., 2015). In programme management the main orientation is on coordination between projects and issues and on overcoming boundaries, over the benefits of demarcation (Lycett et al., 2004). We can therefore expect little drawing of boundaries. However, some studies find drawing of boundaries does occur and can also be useful to protect emerging programmes, e.g. by reserving time to work on them and to build momentum and readiness for change (Lehtonen & Martinsuo, 2009; Pellegrinelli, 2011). This demarcation was found to occur together with and complementary to boundary spanning efforts. As Lehtonen and Martinsuo (2009) show that the nature of boundary management changes during the course of programmes, an interesting question here is at what moments during the process drawing occurs and is useful.

(3) Challenging, negotiating and changing boundaries in order to e.g. include new actors, ideas, or resources. In integrative work, boundaries often become challenged as bringing about innovative integrative solutions often requires a deviation of previously established monosectoral practises, norms and identities (Van Broekhoven & Vernay, 2018). The emergent, adaptive, and non-linear nature of programmes, where effective programme management involves their continuous shaping in terms of content and structure, suggest boundary management will involve continuous challenging and changing of the boundaries of the programme itself in order to adapt to a changing environment and changes in strategic goals. Moreover, it is likely that integrative programmes will also involve changing or challenging established boundaries of the issues and projects with which they aim to integrate, in order to come to integration and develop synergetic benefits.

In order to systematically observe these ways of managing boundaries in our case study, we furthermore distinguish (interrelated) dimensions of boundaries that actors may address with their boundary actions: social boundaries between groups of people such as farmers, water managers, nature workers; cognitive boundaries such as between different perspectives, ways of working, knowledge and language, and physical boundaries such as between geographical jurisdictions (Van Broekhoven et al., 2015). We combine these dimensions with the specified boundary actions as a lens to map and interpret boundary (re)construction. Table 1 presents indicators on each of these dimensions and for the three types of boundary actions, which we use to analyse the case study.

Table 1. Operationalization boundary actions. Source: Van Broekhoven et al., 2015, modified by authors.

Dimension	Enactment			
	Spanning	Drawing		Challenging
		Reconfirming or establishing	Regulating	
Social (boundaries between groups of people, 'us' and 'them')	Building or enhancing connections with actors across a demarcation	In/excluding actors in decision making or group actions Use of language: We/us–they/them	Buffering or regulating the access of others across a demarcation	Problematizing / changing established demarcations about who is in/excluded in decision-making process
Cognitive (boundaries in conceptions of problems and solutions, possibilities or ideas taken in account)	Strategies enhancing flow of information or ideas across a demarcation, e.g. exploring other's interests, developing 'common ground' shared stories on project	Demarcating limits on (im) possibilities or ideas taken into account Differing conceptions of problems or solutions Dividing who leads on what	Buffering or regulating the flow of information or ideas between social worlds	Problematizing / changing existing frames/ideas or (im)possibilities. Problematizing divisions of roles, tasks, or responsibilities
Physical (physical/material or territorial boundaries)	Physical connections perceived by involved actors as not directly challenging a demarcation, boundary objects	Physical or territorial (ownership) divisions	Physical interfaces regulating or monitoring the physical flow across	Physical events or things that do not keep to the demarcation between social worlds

2.3. Contextual factors influencing how actors manage boundaries

To understand how programmes are managed successfully, knowing the context in which the programme takes place is crucial (Lehtonen & Martinsuo, 2009; Lycett et al., 2004; Pellegrinelli et al., 2007). We therefore analyse how contextual factors influence and explain the boundary actions that are employed and the integration that is achieved in the case study. Lehtonen and Martinsuo (2009) identify three main types of contextual factors:

(1) Factors related to the characteristics of the organization or issue with which integration is sought. Integration is not just influenced by the programme itself, but the organizations or issues with which integration is sought also enable or constrain it. Building on Lehtonen and Martinsuo (2009) we distinguish the working culture (e.g. a project management culture, or a culture of dialogue), previous experiences with programme management and with the content of the programme, and the organizational structure and way in which departments are involved in the programme.
(2) Factors stemming from the nature of the programme itself, specifically the importance of the programme to top management and the involvement of top management. As we here study two integration attempts within a programme, we will specify these factors to the nature of the integration attempts, i.e. the importance of the integration attempt to top management and the involvement of top management in the integration attempt.

(3) Factors related to the individual characteristics of the programmes' key actors, especially the programme managers. The literature on boundary spanning provides insights in factors influencing actors' capacity to span boundaries. Firstly, to be able to build connections actors need to know and be credible to people on both sides. They need to have strong links internally and externally, and be seen as competent, in order to gather information and translate it across (Levina & Vaast, 2005; Tushman & Scanlan, 1981). Scholars have identified leaders or 'reticultists' can play an important role in this, as important and powerful individuals who can construct cross-boundary coalitions (Degeling, 1995). Secondly, actors spanning boundaries furthermore need to be aware of the needs, norms and context on both sides of the boundary, in order to find relevant information and translate it to the other side (Tushman & Scanlan, 1981; Williams, 2002). In this respect it is also important actors know how and where to get information and who needs it.

2.4. Realizing integration around a programme

To explore what kind of boundary management helps to realize integration in programmes, we need to assess the success of the integration efforts around a programme. To do so we build upon Pellegrinelli et al. (2007), who argue good programme management is about the '*significant and on-going crafting of programme content, structures and processes to reconcile divergent aims and interests, to expedite progress in the face of adversity and to engage multiple sponsors, contributors*'. This suggests three important aims in programmes: (1) Reconcile divergent aims and interests (Do actors succeed to develop certain integration possibilities which they jointly want to work on in the programme?); (2) Expedite progress (Do actors succeed in realizing intended integration possibilities, or making them more likely?); and (3) Engage multiple stakeholders (Are more stakeholders involved? Are existing stakeholders involved more closely? Is a group of actors developed that want to work on integration possibilities together?)

3. Methods

To study in-depth the micro-interactions of boundary management and explore boundary actions and configurations of actions over time we use a single longitudinal case study design. The case is selected using the principle of maximalisation, i.e. choosing a case where the topic of study manifests itself most strongly and is transparently observable (Boeije, 2009). We selected a regional collaborative programme where actors integrate several sectoral objectives including water management, spatial planning, agricultural development and nature conservation.

Given the institutional and historical differences between water management and spatial planning (Wiering & Immink, 2006; Van Buuren, Edelenbos, & Klijn, 2010; Van Broekhoven et al., 2015), and nature conservation and agriculture (Derkzen et al., 2009) in The Netherlands, this provides a setting where boundaries as traces of past activities are strongly present. Moreover, the case is an ongoing programme, providing ample opportunity to study boundary management in action through observations.

To map how boundaries were managed the development of the collaborative programme is reconstructed, from 2009 (idea for the programme rose) up to 2014 (programme is going into implementation phase). Data is gathered by: (a) semi-structured interviews; (b) document analysis; and (c) observations of actors' interactions (see Table 2). Using multiple data sources reduces the risk of distortions in post-factual accounts and increases internal validity. We collected documents through respondents and websites of involved organizations, interviews were transcribed, and reports were made of observed meetings.

To identify boundary actions over time, we developed a chronological database in Excel by selecting from each interview, document and observation, articulations of incidents that indicate the activation, contestation or crossing of a boundary, based on the definition of boundary actions and indicators in section 2.2. This led to 313 incidents. Next, incidents named by multiple sources were summarized into one, and coded with the aim to identify occurrences of the specified boundary actions (using colour coding to identify types of boundary actions and patterns over time). This resulted in 88 boundary actions. Obviously, this does not represent the entire population of boundary actions in the case. Reconstructing, observing and recording all possible incidents that happened over time is not humanly possible, or even desirable. Given our method of data collection, we assume that we have captured at least the most significant boundary actions. Also, there is no a priori reason to suppose our method biases a particular type of action.

We focus in this article on two sets of boundary actions within the case, which evolve around two integration attempts. The first set evolves around the ambition to integrate the DHZ with the national Deltaprogramme; the second around the ambition to integrate spatial planning issues in the programme. Many activities observed in the DHZ centred on these two ambitions. Of the total of 88 boundary actions, 47 were related to integrating with the Deltaprogramme, and 24 to integrating with spatial planning.

Next, we assessed the performance of the integration attempts on reconciling divergent aims and interest, expediting progress, and engaging stakeholders. Lastly, we analysed how contextual factors shaped how boundaries were managed by identifying the in section 2.3 specified contextual factors for both integration attempts, how these varied between both, and assessing how this explains differences in how actors managed boundaries and in the performance of both integration attempts. This is an interpretive act of the researchers.

4. Results

We first introduce the case. Next, we analyse the actions that actors employed to manage boundaries during the process for both integration attempts. We then analyse the

Table 2. Data collection.

Document analysis	47 documents covering the studied period 2009–2014, e.g. project documents, minutes of steering group and project group meetings, discussion documents for steering and project group, covenants between actors, documents on the DHZ programme of involved organizations
Observations of meetings	One of the researchers has observed meetings of the project group, steering group, and symposia and workshops organized around the programme from 2012–2014, in total 14 meetings
Interviews	12 interviews with actors from the organizations involved in the DHZ (administrative and political level)

integration reached for both attempts. Lastly, we analyse contextual factors that shaped how boundaries were managed. We observed no activities that addressed the physical dimension of boundaries in both integration attempts, perhaps fitting with the developmental stage the process was in. Activities stayed at writing documents and having meetings, and did not materialize into any actual physical activities or delineation to geographical boundaries (e.g. identifying the locations where measures will be taken) yet.

4.1. Introducing the case

The DHZ is a regional collaborative programme where various regional actors (four waterboards; two provinces; a nature organization; Rijkswaterstaat Noord-Brabant; two agricultural organizations; and a drinking water company) work together to develop a climate robust water supply and spatial planning on the high sandy soils in South-Netherlands. The programme started in 2009. In the subsequent process actors developed a strategy and implementation programme, organized activities to gain support and attract more partners in the programme, and lobbied to get more recognition from a parallel national programme: the Deltaprogramme, which focusses on adaptation and water management, with various thematic and regional sub programmes (see Van Buuren et al., 2014). Summer 2014 19 regional organizations formally affirmed their collaboration by signing an intention agreement to realize the implementation programme and invest 106 million in the DHZ, if the Deltaprogramme would provide co-financing. September that year the national government formally decided upon five so-called Delta Decisions prepared by the Deltaprogramme: main choices on the approach to realize water safety, fresh water supply, and a climate- and water robust organization of The Netherlands. As part of these Delta Decisions, a co-financing of 60 million euros was appointed to realize DHZ measures. Figure 1 shows the main events in this programme. These are further discussed below.

4.2. Boundary actions during the process of two integration attempts

4.2.1. Integrating with the Deltaprogramme

Here we analyse boundary actions that evolve around the interaction between the DHZ programme and the Deltaprogramme. Table 3 presents the most characteristic boundary actions that signal how boundary management developed.

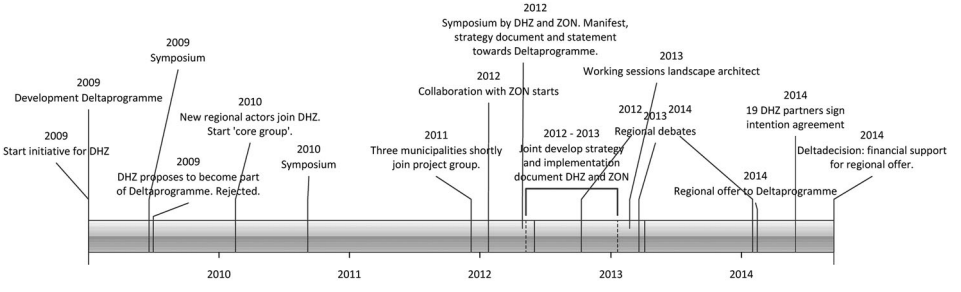

Figure 1. Timeline development Deltaplan Hoge Zandgronden with main events.

At the start of the DHZ programme the initiating regional actors (see 2.1), led by a waterboard, undertook various boundary spanning actions aimed at bridging social and cognitive boundaries. One of their first big actions was to organize a symposium to get more support for regional issues of climate robust water supply and spatial planning. Here they invited national actors, in order to show that the regional ambitions and problems regarding drought and fresh water supply fitted well in the Deltaprogramme. In parallel actors also bridged boundaries towards regional partners on the social dimension (e.g. developing joint coordination structures including a project group and steering group) and the cognitive dimension (e.g. sending a strategy document to possible partners), strengthening the programme itself by attracting further support from regional actors.

Later in 2009 actors in the DHZ, led by the programme chair, proposed to the national Deltaprogramme that DHZ should be added as regional sub-programme to the Deltaprogramme. They thereby put the division between the regional DHZ programme and Deltaprogramme up for discussion. They argued that the Deltaprogramme mostly focussed on the Western parts of The Netherland and did not pay enough attention to water issues in high areas of The Netherlands, and wanted the high areas of The Netherlands to be equally included. However, here the Deltaprogramme drew boundaries, deciding not to integrate the DHZ in the Deltaprogramme. Nevertheless, the DHZ steering group decided to continue the regional programme on their own and continued their

Table 3. Illustration of boundary actions Deltaprogramme.

Dimension	Enactment		
	Spanning	Drawing	Changing
Social	2009, 2010, 2012 Symposia inviting regional partners and Deltaprogramme From 2010 Occasional visits of Deltaprogramme to DHZ (participating in steering group meeting, informal visit to region) 2011 Involvement chair DHZ in steering group of subprogramme of Deltaprogramme 2014 Intention agreement DHZ signed by 19 regional organizations	–	2009 Start DHZ steering group and project group consisting of regional partners 2012 DHZ starts collaboration with ZON Programme, joint core team and sessions
Cognitive	2009 Strategy document on DHZ, send to potential partners 2009 DHZ steering group decides to continue communication and lobbying towards the Deltaprogramme, keep looking for alignment 2012, 2013 DHZ and ZON jointly develop strategy documents directed at the Deltaprogramme (manifest asking funding and acknowledgement, 'regional offer' towards Deltaprogramme)	2009 DHZ actors: drought problems get too little attention in Deltaprogramme 2009 Deltaprogramme will not include DHZ as subprogramme, DHZ will continue by itself	2009 Proposal of DHZ to include itself as subprogramme in Deltaprogramme 2012–2014 Deltaprogramme wants to consult regions. DHZ and ZON organize this for their region and discuss also own strategy documents with regional actors 2013–2014 Representatives of the Deltaprogramme are increasingly involved in the development of the regional offer, e.g. commenting on draft versions 2014 Deltaprogramme takes up regional offer in programme and provides co-financing

attempts to bridge this divide. Moreover, they identified communication and lobbying with the Deltaprogramme as one of its core tasks.

In the subsequent process we observe many more boundary spanning actions. Actors doubled their efforts to connect with the Deltaprogramme. In the period of 2010–2012 actions were mainly aimed at developing more dense relations (bridging social boundaries), e.g. organizing another symposium inviting the Deltaprogramme, inviting actors from the Deltaprogramme to join steering group meetings, a field visit in which actors could interact informally. Visa versa, the chair of the DHZ in 2011 gained position in a steering group of the Deltaprogramme. Representatives of the DHZ's project group and the Deltaprogramme also started collaborating on models analysing effects of climate change, bridging cognitive boundaries.

In 2012 the DHZ joined up forces with ZON, a regional initiative around drought in the East of The Netherlands. This broadened the scope of the programme and changed its boundaries. To collaborate actors spanned boundaries between DHZ and ZON socially (e.g. meetings, jointly organizing symposia), as well as cognitively (e.g. jointly developing an implementation and strategy plan). The main reason they did so was to strengthen their lobby towards the Deltaprogramme, and respondents in hindsight reflect this indeed had this effect. As one respondent stated: '*Eventually, due to the joined lobby efforts of ZON and DHZ, we gained a very clear place within the Deltaprogramme'*. Broadening the boundaries of the programme this way helped making it more relevant and thereby facilitated the integrative ambition towards the Deltaprogramme.

From 2012 the Deltaprogramme sought to engage regional actors (through regional consultations). For this, they needed regional partners. The actors in the DHZ and ZON, led by the programme chair, stepped up to organize this in their region. They thereby acted as intermediates for the Deltaprogramme towards other regional partners. Moreover, they framed their own implementation programme as the regional input towards the Deltaprogramme, and proposed to develop a 'regional offer' for the Deltaprogramme. Representatives of the Deltaprogramme became increasingly involved in the development of this regional offer. They e.g. commented on draft reports, bridging cognitive boundaries. Over time, the DHZ strategy became more and more part of the strategy of the Deltaprogramme itself, and the DHZ became a valuable partner for the Deltaprogramme. This shows a constant evolvement of the linkages between the DHZ and Deltaprogramme, and sometimes it was very difficult to determine which activities were part of which side. Along the process, as boundaries between the DHZ and the Deltaprogramme continued to be spanned, they became more and more undefinable. Eventually, this (partial) integration of both programmes reached a next level when the Deltaprogramme formally decided that the regional drought management goals and strategies outlined in the 'regional offer' would be taken up as element in the Deltaprogramme and receive co-financing from the Deltafund.

4.2.2. Integrating DHZ programme and spatial planning issues

A second group of boundary actions evolves around the ambition to involve regional spatial planning issues more into the programme. This was seen an important issue because of the fact that concrete measures to safeguard fresh water supply also have spatial implications and only can be realized when they are anchored in spatial plans. Table 4 presents the most characteristic boundary actions.

From 2010, the ambition to involve spatial planning issues and municipalities and provincial spatial planning departments that govern spatial planning issues more in the programme was recurrently articulated in meetings of the project and steering group. The project and steering group tried to do so by involving municipalities and planning departments in and informing them about the programme, spanning social boundaries. At the same time the programme substantively focussed on water and drought issues. Several actions enhanced this focus: In 2010 actors set up a core team consisting (only) of representatives of the water boards (who did not have responsibilities regarding planning, but only on water management). In addition, the steering group decided to divide tasks and appoint the provinces (responsible authority for spatial planning) as lead actor to realize integration with spatial planning issues, whilst the water board chairing the DHZ would lead the collaboration with the Deltaprogramme. However, the provinces were not part of the core team, and respondents reflected that at the start of the programme they did not take a very active role. Noticeably, by dividing tasks in this way, new boundaries emerged in the organization of the programme. Respondents reflect that establishing the core team increased the sense of ownership of the programme for the actors in it, but created a distance towards those that were not. In 2012 social boundaries became spanned when three municipalities joined the project group. However, the municipalities soon stopped attending meetings and continued as 'agenda member' (i.e. receiving documents but not attending meetings).

In 2012 the substantive focus on water management was articulated and criticized by the DHZ steering group. They stated the programme was too oriented on water issues, and too little on issues as economy and space and place, which resulted into very limited involvement of e.g. municipalities. Similarly, during a regional conference in 2013 a representative of a municipality stated that municipalities were not involved

Table 4. Illustration of boundary actions spatial planning.

Dimension	Enactment		
	Spanning	Drawing	Changing
Social	2010–2013 Steering group wants to involve municipalities and other actors involved in spatial planning and urban environment in DHZ. The actors in DHZ are asked to each contact and inform their planning contacts. 2012 Three municipalities join project group (but soon stop attending meeting) 2012 Representatives of provinces join DHZ core team 2013 Municipality joins project team as agenda member 2014 Municipality signs intention agreement and joins a project group meeting	2010 Core team is set up with only water boards 2012 The three municipalities stop attending meetings, stay on as agenda member	-
Cognitive	2013 Two day workshop to interactively develop spatial planning perspective on two areas 2013 Written consultation of region on implementation programme, one municipality responds	2012 In their strategy document the DHZ actors reflect they have been too oriented on water management and too little on issues of space and place 2013 Statement of municipality at regional consultation that the programme is mainly a technical story and '*a water board party*', and municipalities are not involved well in the programme	-

sufficiently because the programme was mainly oriented at technical and water related issues, referring to it as 'a water board party'. Actors here hence articulated that they perceived and struggled with a cognitive boundary between the worlds of water and spatial planning, in line with earlier studies (Wiering & Immink, 2006; Van Buuren, Edelenbos, et al., 2010).

Noticeably, we didn't observe actions that addressed cognitive boundaries in the first years of the programme. Hereafter, in 2012 and 2013, boundary management did address spanning cognitive boundaries. In order to deal with the above criticism and to stimulate a more active role for the provincial representatives, in 2012 representatives of the provinces joined the core team. In 2013 these representatives organized a two day integrative workshop led by a landscape architect, with the aim to develop an integrated design for two areas in the region. The idea was that spatial planning actors could be involved more if the programme worked more from a planning perspective. Noticeably, participants in the workshop were selected to represent different disciplines (like hydraulics, spatial planning, nature conservation), but the organizers explicitly chose not to include participants of the DHZ steering group, project group or core team. The workshop was hence aimed at bringing together different perspectives (spanning cognitive boundaries), but did not bring together actors inside and outside of the programme who had such perspectives (not spanning social boundaries).

In 2013 one more municipality joined the DHZ project group as agenda member. The formal intention agreement in 2014 was signed by one municipality. Noticeable here is that multiple municipalities became involved at different moments in time. No enduring group of actors was developed that could build forth (e.g. upon the ideas developed in the workshop) and come to a shared idea of the issues at stake in the DHZ. The limited involvement of municipalities was attributed by involved actors to the programme's substantive orientation on water issues. The boundary spanning attempts discussed above were apparently not powerful enough to bind municipalities to the programme.

Noticeably, although actors in the DHZ tried to bridge boundaries by involving municipal actors in the programme and organizing an integrative workshop, we observed no actions that indicate that the relevance or place of a boundary was challenged or changed during the process. In line with this we found no activities to defend boundaries (for instance actions to shape the programme or statements that it doesn't fit with ideas or projects of municipalities), although both DHZ actors and municipalities did articulate that they experienced a problematic boundary by stating that the programme did not succeed in bridging the worlds of spatial planning and water management. This way, it remained unclear what different viewpoints and interests between the programme and spatial planning actually were. Moreover, this supports the idea that the programme remained focussed on water management and actors didn't manage to broaden its scope to include or affect spatial planning in such a way that it had effect on existing boundaries.

4.3. Analysis of programmatic integration

4.3.1. Integrating with the Deltaprogramme

The ambition to integrate with the Deltaprogramme was rather successful, when looking at the three criteria as suggested by Pellegrinelli et al. (2007). With regard to reconciling

divergent aims and interests, at the start both programmes were not in line. The actors collaborating in the DHZ felt the Deltaprogramme had insufficient attention for regional water issues. However, over time both programmes became more interwoven. Moreover, with the joint implementation programme and regional offer, actors specified regional measures and strategies, and how this related to the Deltaprogramme. As such, it became an offer that was easily adopted by the latter. With the Delta Decision the embedding of regional measures in the Deltaprogramme became formalized.

With regard to expediting progress, actors succeeded in making it more likely that intended integration possibilities would be realized. With the Delta Decisions, the connection between DHZ and the Deltaprogramme was formalized, and the DHZ received co-financing. Moreover, with the intention agreement regional actors formally bind themselves to the ambition to realize the proposed implementation programme. However, no concrete measures or projects were specified yet and actual realization of measures hence remained to be done.

With regard to engaging stakeholders we found that actors of the Deltaprogramme over time became more closely involved, e.g. through inviting them to the regional symposia and meetings of DHZ, sharing and discussing concept versions of the implementation programme and strategy. In addition, new regional actors became involved, e.g. by collaborating with ZON.

4.3.2. Integrating spatial planning issues in DHZ programme

The ambition to connect drought management goals with spatial planning was less successful in the studied period. With regard to reconciling divergent aims and interests we found no signs that the broad ambition to integrate with spatial planning was specified further into a concrete interpretation of possible topics or issues on which integration should be sought (for example, a possible further specification would be to identify how measures to safeguard fresh water supply have spatial implications in specific areas, or which spatial plans or projects have an impact on future water measures). Consequently, we also saw no signs that plans were made how this broad ambition should be realized. This is supported by statements of actors that the integration with spatial planning is difficult and remains to be developed.

With regard to the engagement of stakeholders we found that whilst some municipalities joined the project group, they did not remain involved throughout the process. No enduring group of actors is developed to jointly work on integration possibilities. Existing partners however did become more closely involved when representatives from province were added to the core team.

4.4. Analysis of contextual factors

Below we analyse how contextual factors explain the differences in how actors managed boundaries for both integration attempts and why one integration attempt was more successful than the other.

4.3.1. Factors related to the issue with which integration is sought

The Deltaprogramme is a high profile and concrete programme with a clear organization structure. The Deltaprogramme is led by an independent Deltacommisioner supported by

a staff office, and consists of five sub programmes including one on fresh water supply. Thanks to this clear structure DHZ actors were able to specify and direct boundary actions at specific people, content and organizational structures. In addition, the Deltaprogramme is in terms of substantive focus and approach rather similar to the DHZ. The focus of the Deltaprogramme (although originally strongly on flood risk management) moreover became more and more on drought and water supply and thus came to cover the aim of DHZ quite well, in part due to the DHZ's lobbying efforts. Moreover, as the Deltaprogramme sought regional support and input, the DHZ over time became a valuable partner for them.

In contrast, the spatial planning issues that actors sought to integrate in the programme remained of a fluid, amorphous nature throughout the process. The broad ambition to integrate the regional spatial planning issues of municipalities and provinces into the programme was not specified further into concrete integration possibilities. So, the question 'what to integrate' remained rather vague and elusive. Consequently, DHZ actors directed boundary spanning activities at a very broad group of actors. In the region targeted by the DHZ programme there are two provinces and 97 municipalities, each with their own spatial planning issues and projects. These rather general boundary spanning attempts were not powerful enough to bind them to the programme and come to successful integration.

In addition, actors working on spatial planning are focused on a different subject than water managers. For both water managers and spatial planners it is difficult to think beyond their own discipline and to recognize that the tasks of the other has implications for their own task (Wiering & Immink, 2006). It is thus difficult to interest actors working on spatial planning for the DHZ. Surprisingly however we found only limited activities to make the DHZ more attractive for these actors and to communicate its relevance for planners. This can in part be explained by the focus of actors on the Deltaprogramme, leaving less time for the integration efforts regarding spatial planning. We further discuss this in the next section.

4.3.2. Factors related to the two integration attempts

In addition, the difference in efforts to span boundaries is also explained and amplified by the organization of the DHZ programme and the two integration attempts themselves. Firstly, the importance of the integration attempt to top management and their commitment shaped how boundaries were managed. In the case, the integration with the Deltaprogramme over time became the dominant issue on the agenda of the DHZ steering group. The Deltaprogramme is a high profile programme and the actors in the DHZ see a connection with this programme as highly relevant, not in the last place due to the possible financial support of the Deltafund. The Deltaprogramme included a Deltafund consisting of a large yearly budget to realize climate adaptation measures. By putting the regional problems with drought and fresh water supply on the agenda of off the Deltaprogramme, the DHZ wanted to be able to make a claim for (co)financing from the Deltafund. Secondly, the task division made in the organization of the programme (discussed in section 4.2.2), reinforced the positive bias to the integration with the Deltaprogramme. The attention and efforts of the programme chair were on the Deltaprogramme. He puts this issue high on the agenda of the steering group, and informs the participants regularly about lobbying initiatives and results of meetings with the

Deltaprogramme. The politicians of the provinces had the lead when it comes to integrating with spatial planning issues. However, at the start of the DHZ climate change was in both provinces not an important political issue. Provincial politicians took a much less active role in the programme and in putting this issue on the agenda of the steering group. The provinces also took a less active role at the administrative level and provincial civic servants were during the first years not part of the core team, which did most of the work in terms of writing strategy documents and preparing the agenda for the working group and steering group. This task division resulted actually in new boundaries within the DHZ programme. Noticeably, the increasing and large attention for the integration with the Deltaprogramme (dominating the discussion in steering group and project group meetings) leaves less room for other issues. One respondent reflected:

> We operated on many levels at the same time, the attention was sometimes at one issue and other times at another. [The programme chair] felt it was important to act upon the Deltaprogramme [… .], that led to less focus on whether we were ambitious enough within the region.

The programme chair reflected: 'We were so busy with the way in which we should get recognition from the Deltaprogramme that this consumed much of our energy'. We conclude that the attention bias for one integration attempt can hence push aside other issues in complex programmes where multiple issues and projects need to be integrated.

4.3.3. Factors related to individual characteristics

The differences in how boundaries were managed were further enlarged as the programme chair possessed many capabilities that facilitated successful boundary spanning. Respondents describe him as a respected, visionary and charismatic leader and very enthusiastic and energetic about the programme and integrating with the Deltaprogramme. He had strong contacts regionally and nationally, and acted as a 'reticultist' to interest and bind actors together in the programme and on the issue of drought and fresh water supply. The civic servant chairing the project group and core team took a similar role on the administrative level, leading both the programme as a whole and the integration with the Deltaprogramme. Many respondents reflect on the role of the chair as crucial for successfully connecting with both national and other regional actors and initiatives, as well as for the progress of the programme as a whole. He effectively used these skills to span boundaries with regard to the Deltaprogramme. But due to the division of tasks, he was only limitedly involved in integrating with spatial planning issues. A political leader bridging boundaries was not similarly supporting the provincial civic servants responsible for this issue. In addition, spanning boundaries here is further complicated as all participants in DHZ (including those from provinces) are working on water management within their organization, and hence look at the programme from a water perspective, making it difficult to connect the programme to perspectives and tasks of spatial planners.

5. Discussion and conclusions

The analysis shows the importance of boundary spanning actions to realize integration of different issues and projects in a programmatic approach, such as jointly working on strategy documents (bridging cognitive boundaries), organizing events where actors can

formally and informally interact (e.g. symposia, workshop), and the activities of a political change agent. In line with our expectations, we find that to manage boundaries actors predominantly undertake boundary spanning actions during the process of both integration attempts (e.g. Lycett et al., 2004). However, actors undertook many more boundary spanning actions in the process to integrate with the Deltaprogramme than in the process to integrate with spatial planning issues. This partially explains why integration was more successful regarding the Deltaprogramme. As shown in previous studies, activities to span boundaries facilitate interaction (Klerkx et al., 2010; Tushman & Scanlan, 1981; Williams, 2002). In addition, and we consider this an important contribution of this paper, we find four further explanations why actors were better able to integrate with the Deltaprogramme than with spatial planning issues, that have not received much attention in the literature before. These explanations shed new light on how boundaries can be best managed in future programmatic approaches:

1) Contextual factors influence boundary management

We find that several contextual factors explain why actors put more effort into spanning boundaries regarding the Deltaprogramme than spatial planning issues. The first contextual factor relates to the clarity of the issue with which integration was sought. In the Deltaprogramme, DHZ actors were able to specify and direct boundary actions at specific people, content and organizational structures. On the contrary, the lack of further specification of the specific issues or projects with which integration was sought resulted in actors undertaking rather general boundary spanning activities directed at a very broad group of actors in the spatial planning attempt. As a result, in the latter case the boundary spanning attempts were not powerful enough to bind them to the programme.

The second contextual factor is the focus of top management, in the sense that they dedicate a substantial share of their time and energy on the Deltaprogramme. The task division made in the organization of the DHZ programme, with the programme chair in being in charge of the integration with the Deltaprogramme, reinforced this attention bias.

The third contextual factor is the individual characteristics of key programme actors. In our study we see that the programme chair played a crucial role in spanning boundaries with regard to the Deltaprogramme, acting as a 'reticultist' or political change agent to interest and bind actors together in the programme and on the issue of drought and fresh water supply. This is in line with earlier findings of the role of political change agents (Degeling, 1995; Klerkx et al., 2010). However, due to the division of tasks, his skills were not used to facilitate integration with spatial planning issues.

Summing up the above, we conclude that these contextual factors influence how actors manage boundaries and how well integration succeeds, in line with Lehtonen and Martinsuo (2009). This adds to our understanding how programmes and the type of management needed are shaped by the context in which they take place (Pellegrinelli, 2011; Pellegrinelli et al., 2007). This triggers the question how programme managers can deal with the demands from context in future programmes. We put forward three suggestion based upon this research: (1) Consider consciously and strategically how attention is divided between the multiple issues with which integration is sought in complex integrative programmes. As a result of the contextual factors discussed above a positive feedback loop seems to develop on multiple levels, leading to an attention bias in favour of the

Deltaprogramme. Although beneficial for this integration attempt, the inevitable result was that actors had less time left for spatial planning issues. As such, we conclude that the attention bias for one integration attempt can push aside other issues, as also found in complex multifunctional projects (Van Broekhoven & Boons, in review). This is problematic as an important element of programme management is continuously establishing connections between multiple projects and issues in its environment (Lycett et al., 2004). By being aware of this, practitioners can make a more conscious and strategic choice when to give which issues attention. (2) Strategically use the skills of key programme actors to span boundaries and make use of actors who can act as political change agents. (3) Aim to clarify/specify the issue with which integration is sought and make the own programme attractive to the actors governing the issues with which integration is sought. This is further elaborated upon below.

2) Making the programme attractive

The second explanation why the integration regarding the Deltaprogramme was more successful is that actors succeeded better in making the DHZ programme attractive for the Deltaprogramme by continuously changing and shaping their boundaries in terms of content, geographical area, involved actors and governance structures. For instance, actors collaborated with ZON, changing the scope of the programme drastically, to make themselves a more attractive and important partner for Deltaprogramme. This changing of boundaries is related to overcoming differences on the cognitive dimension. This is illustrated by the development of the joint implementation programme of DHZ and ZON, in which representatives of the Deltaprogramme become involved as they comment on concept versions. Over time this becomes an important input for the Deltaprogramme, and brings both programmes closer together. Noticeably, we did not observe challenging and changing of boundaries in the integration attempt with spatial planning. This can be explained by the limited effort to communicate the programme's relevance for planners, and limited involvement of perspectives and actors from spatial planning in the programme. Apparently, for neither water managers nor spatial planners it was very attractive to bring together their plans and interests in this programme. The above elaborates upon earlier findings that continuous shaping of programmes and their governance environment is important in programme management in order to bring together different goals and interest, make progress and involve different stakeholders (Pellegrinelli et al., 2007). We conclude that actors need to make their programme attractive for the actors governing the issues and projects they want to integrate with in order for them to be willing to connect.

3) Addressing both the social and cognitive dimension of boundaries

The third explanation is that boundary spanning and changing activities regarding the integration with spatial planning issues only limitedly, and only later in the process, addressed the cognitive dimension of boundaries. We know from previous studies that water managers and spatial planners in The Netherlands traditionally have different visions on water issues and the position of water in the planning process (Immink, 2005; Van Buuren, Edelenbos, & Klijn, 2010; Wiering & Immink, 2006). Indeed, the expectation that differences between the worlds of water and spatial planning would lead to discussions on boundaries was one of the reasons to select this case. Hence, effort is needed to span cognitive boundaries, which we only limitedly found in the case. In addition, and adding to the literature, we conclude that spanning and changing

of the social and cognitive dimension of boundaries should go hand in hand in order to successfully work across boundaries. In the process to integrate with spatial planning, actors in the first years undertook some activities to span social boundaries but substantively kept a strong focus on water management. Only later actors also addressed the cognitive dimension, by organizing an integrative workshop. However as the participants of the DHZ weren't at this workshop, social boundaries are not spanned here. This in turn has consequences for cognitive boundaries, as actors cannot build forth upon the ideas developed in the workshop and together over time come to a shared idea of the issues at stake. In contrast, the integration with the Deltaprogramme illustrates how boundary spanning and changing actions that address the social dimension (e.g. inviting representatives of the Deltaprogramme to symposia, meetings, field visits) and the cognitive dimension (e.g. commenting on concept reports) together facilitate the integration of the DHZ and the Deltaprogramme.

How then can actors manage boundaries at both the social and cognitive dimension in future programmes? Previous studies identified various strategies, including joint construction of boundary objects, through which actors can develop an understanding of the integrative idea and a discourse and symbolism that transcends the own interests (cognitive dimension) (Star & Griesemer, 1989; Klerkx, van Bommel, Bos, Holster, & Zwartkruis, 2012; Westerink et al., 2017); activities of boundary spanners to build cross-boundary relations (social dimension) and identity and facilitate building shared problems and solutions (cognitive dimension) (e.g. Williams, 2002); and creating formal coordinating structures (e.g. project groups) and informal meetings (e.g. excursions, field visits) that facilitate interaction and through which actors can define themselves as a group, enabling feelings of 'jointness' (social dimension) (Epstein, 1992, Marshall, 2003.

4) The role of drawing boundaries

Lastly and interestingly, we find that in addition to boundary spanning, boundary drawing activities also play a role in realizing integration in a programme. This is in contrast with the idea that boundaries should not be defined too strict in programmes. While drawing boundaries is often seen as problematic for integrative initiatives, the analysis shows that the decision not to make the DHZ a sub-programme of the Deltaprogramme (drawing boundaries at an early stage in the process) does not result in the integration attempt stopping or failing. Instead, the initial 'no' of the Deltaprogramme urged DHZ actors to double their efforts and continue to look for alignment, resulting in further actions spanning, and in effect challenging, previously defined boundaries. Drawing the line seems to have been helpful to create an understanding and respect for boundaries. The occurrence of boundary drawing with a positive effect, complimenting boundary spanning, is in line with previous findings on programme management by Lehtonen and Martinsuo (2009). However, in our case the role of boundary drawing is not – as they find – to protect the emerging programme. It is more in line with a mechanism discussed by Ernst and Chrobot-Mason (2010) and Lee, Magellan Horth, and Ernst (2014) that in order to work across boundaries first boundaries need to be created or strengthened. By buffering (e.g. clarifying purpose, dividing tasks) safety is created, and by reflecting across an understanding of boundaries is built that fosters respect (ibid). The opposite is illustrated in the integration with spatial planning where boundaries did not become defended. Here it remained unclear what different viewpoints and interests were, making it difficult to get a grip on how boundaries could be crossed.

Summing up what the above means for the type of boundary management needed in programmatic approaches, we conclude that boundary spanning activities are important to come to integration in programmatic approaches. Moreover, continuously shaping the boundaries between the programme and its environment helped to make the programme attractive for the actors governing the issues and projects they want to integrate with. However, we highlight this does not mean actors should not draw boundaries at all in programmatic approaches. The analysis showed that also in a complex programme context drawing boundaries can be beneficial when actors want to work across boundaries, by creating an understanding and respect for what important boundaries are and for the other's position.

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