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The Corneliusgasse Dilemma: Adaptive Policing and Social Immersion under Deep Uncertainty

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Abstract

Three scheduled Taylor Swift concerts in Vienna (August 8–10, 2024) were cancelled due to intelligence indicating the potential for immediate and violent terrorist action, followed by spontaneous gathering of disappointed fans in Corneliusgasse (a street in Vienna). This historical event motivates the generic analysis of a decision dilemma. The dilemma is the choice between two strategies that are formulated in the context of the Taylor Swift cancellation: static containment by the police of the fans at the stadium perimeter, or dispersal of the fans in Corneliusgasse with police immersed in the crowd. Given limited information available to the authorities, The Stadium scenario offers a better predicted outcome but it suffers from greater vulnerability to uncertainty. Conversely, the Corneliusgasse scenario is predicted to have a worse outcome but is more robust to uncertainty. In other words, the generic dilemma was the choice between a putatively better but more uncertain option, or a putatively worse but less uncertain option. Info-gap decision theory is used to quantify this dilemma, and to provide a basis for choosing between the options. From a sociological perspective, the paper explicates how and why this robustness is generated: the shift from a „Warrior“ to a „Guardian“ posture and the use of „rhizomatic immersion“ actively reduce the vulnerability to uncertainty in the Corneliusgasse scenario, thereby enhancing the robustness of the system against unknown threats.

1 Introduction and Background

The cancellation of the three scheduled Taylor Swift „Eras Tour“ concerts at the Ernst-Happel-Stadion in Vienna (August 8–10, 2024) represents a critical disruptive event that challenged conventional paradigms of urban security and crowd management. The disruption was

precipitated on the evening of August 7, when the organizer Barracuda Music was forced to cancel the events following the discovery of a concrete Islamist terror plot. Intelligence provided by the Austrian Directorate of State Security and Intelligence identified a 19-year-old main suspect, who had pledged allegiance to the Islamic State. The cell had stockpiled chemical precursors for TATP (triacetone triperoxide) explosives and machetes, with the specific tactical intent of driving a vehicle into the estimated 30,000 ticketless fans expected to gather outside the stadium — a soft target scenario that rendered the venue's hardened perimeter security obsolete. This situation created a significant security vacuum because the estimated 170,000 fans already present in the city did not disperse.

Faced with this threat, authorities were forced into a decision-making process characterized by deep uncertainty — a condition where the timing, scale, and nature of potential subsequent unforeseen strikes could not be modeled probabilistically.

In the immediate aftermath of the cancellation, authorities faced a choice between two primary scenarios, each characterized by only two parameters in light of the very limited information available. The estimated injury rates for the two scenarios are denoted $\tilde{r}(1)$ and $\tilde{r}(2)$, each with an associated error estimate denoted $w(1)$ and $w(2)$ respectively. It is recognized, however, that each injury-estimate may err far more than the corresponding error estimate. $\tilde{r}(1)$ and $\tilde{r}(2)$ are both honest best estimates and both are highly uncertain, but with vastly different associated uncertainties.

The two scenarios, between which the police had to choose in our hypothetical reconstruction, are characterized as follows:

— **Scenario 1 (The Stadium):** Continuation of a centralized static or hardened security approach. This meant attempting to hold the assembled audience inside a perimeter around The Stadium. This strategy justifies a lower estimated number of injuries ($\tilde{r}(1) = 60$) based on the assumption of static containment with established physical barriers. However, this strategy also justifies a massive uncertainty ($w(1) = 200$) due to the limited knowledge about panic dynamics. The potential for a frustrated crowd to panic, combined with the intelligence gap regarding potential accomplices (such as another 17-year-old suspect employed by a facility management company at the venue), created an unbounded threat landscape.

— **Scenario 2 (Corneliusgasse):** Emergent rhizomatic clusters of fans in the city center. The fans would act spontaneously, forming dense, self-organized clusters in the center of Vienna. This meant allowing dispersal of the assembled audience in the larger open Corneliusgasse area. Although an open urban street gathering inherently carries a higher estimated number of injuries ($\tilde{r}(2) = 260$) compared to the more closely controlled stadium zone, the error estimate ($w(2) = 50$) regarding the development of this scenario was significantly lower due to the specific strategy of immersion of the police in the crowd.

Scenario 2 was what actually emerged. The focal point of this displacement was Corneliusgasse in the 6th District (Mariahilf). Selected by the hive mind of the fanbase due to its linguistic resonance with Swift's song „Cornelia Street" (Swift 2019), this narrow residential alley was rapidly repurposed into a resonance space where fans hung friendship bracelets on a „Friendship Tree," sang anthems, and processed their collective grief. To manage these spontaneous gatherings, the Vienna State Police (LPD Wien) adopted a strategy of „rhizomatic immersion", defined as the embedding of security forces into a non-hierarchical, decentralized network structure where authority flows horizontally through connection rather than vertically through command. This approach necessitated shifting from a „Warrior" posture (enforcement/deterrence) to a „Guardian" model integrated into the social dynamic of the fans. From the perspective of Talcott Parsons' structural functionalism, this integration fulfills a functional requisite for system maintenance, objectively stabilizing the crowd dynamics through shared normative patterns rather than external coercion (Parsons 2012). Unlike the hierarchical command structures typical of riot control, police officers inserted themselves as nodes within the fan network. Extensive documentation from August 8–10, 2024, shows uniformed officers accepting and wearing friendship bracelets — the colorful, beaded accessories central to the Swiftie subculture (Rootenberg 2024). In this context, the friendship bracelet functioned as a cultural passage-token (Elias 1994). By engaging in this reciprocal exchange, officers broke the anonymity of state authority and lowered the aggression threshold of the crowd to near zero.

However, this favorable result could not be known beforehand, when the police had to choose which scenario to encourage or enforce. Our analysis focusses on the a priori assessment of uncertainty-management in these two scenarios, given very limited information. On the one hand, scenario 2 would seem to entail greater potential for injury due to the dispersal of the fans over a

large area. On the other hand, the uncertainty in this estimate is lower than in scenario 1 because in scenario 2 the police are embedded among the fans and are thereby transformed from external observers to internal actors who would be able to monitor emotional shifts and register potential threats more reliably than external surveillance. By becoming internal actors within the fan clusters, the police gained „rhizomatic“ situational awareness — a horizontal flow of human intelligence (HUMINT) that allowed them to monitor emotional shifts and register potential threats more reliably than external surveillance.

The present analysis utilizes info-gap decision theory (Ben-Haim 2006, 2010, 2018) to evaluate the robustness of the choice between the scenarios in response to this spontaneous social phenomenon. In the info-gap framework, the dramatic reduction of uncertainty for scenario 2 via this immersive approach resulted a more favorable trade off between the quality of the outcome and the robustness to uncertainty. This will be elaborated in detail in the following sections. This analysis demonstrates that the Corneliusgasse scenario offered greater immunity to the deep uncertainties of the threat landscape, even though its predicted outcome was worse. This strategy of affective governance and emotional labor transformed a high-risk gathering into a stabilized event.

This tactical success was later institutionalized by the community during the „Swienna Revival“ in August 2025. The anniversary was marked by the unveiling of a commemorative plaque in Corneliusgasse bearing the inscription „Hate has no place here,“ permanently identifying the site where a potential security disaster was transmuted into an act of collective cultural and social resilience. Ultimately, the Vienna case proves that when the predicted outcome is highly unreliable, maximizing the robustness to uncertainty through social immersion becomes the most effective tactical path for maintaining urban security.

Section 2 reviews relevant literature, while section 3 is the core of our info-gap analysis of robustness to uncertainty in the decision confronting the authorities. Section 4 is a concluding discussion. Mathematical derivation of the info-gap robustness function appears in the appendix, section 5.

2 Literature Survey

The events surrounding the cancellation of the Taylor Swift concerts in Vienna in August 2024 were deliberately selected as the central case study for this analysis, as they exemplify a paradigmatic decision-making dilemma under conditions of deep uncertainty. This scenario offers an ideal empirical basis for applying the info-gap decision methology, as authorities were forced to navigate between two distinct and highly uncertain operational realities: a static, security-oriented containment at the stadium versus a dynamic, adaptive management of spontaneous crowds in the city center. To accurately map this dichotomy, a multi-step research methodology was employed. Initially, an extensive Open-Source Intelligence (OSINT) investigation was conducted to reconstruct the sequential timeline of events, the spatial displacement of the crowd, and the specific tactical behaviors observed in the field with high granularity.

Building upon this factual reconstruction, a targeted literature search was undertaken to analyze the operational doctrine of the Vienna State Police. This search traced the origins of the current strategy back to the preparation for the EURO 2008 football championship, where the „Vienna Model“ — internally known as the „3-D Strategy“ (Dialogue, De-escalation, Enforcement [Durchgreifen]) — was institutionalized (Dudek 2008). As documented at this point, this period marked the shift from repressive crowd control to a communication-based approach. The literature reveals that while this model originated in practice, it is increasingly interpreted in modern police science through the lens of complexity research and systems theory (Küppers 2022). This theoretical framing serves as the necessary bridge to the info-gap methodology. It demonstrates that the shift from a „Warrior“ mindset to a „Guardian“ approach is not merely a moral choice, but a systemic optimization of robustness to uncertainty.

The literature review identified seven critical dimensions that distinguish the Vienna Model from traditional riot control, each providing the theoretical parameters for the subsequent info-gap analysis.

First, regarding the **primary mindset** of the security forces, the literature on the Elaborated Social Identity Model (ESIM) posits that police must transition from viewing themselves as external enforcers to constitutive actors of the social situation (Drury and Reicher 2000). Coinciding with the cancellation of the concerts in Vienna, Reicher et al. (2004) highlight that

crowd violence is rarely inherent but is often generated by the interaction itself. Through a participatory framework, police can improve their tactical positioning by forestalling the homogenization of peaceful participants and agitators. Immersion into the group's normative coherence enables authorities to better discern individual aggressions as distinct anomalies, thereby facilitating swifter intervention and de-escalation.

Second, in terms of the **relationship to the crowd**, the concept of „Liaison Policing" suggests that spatial and communicative barriers must be dissolved. Rather than maintaining an antagonistic line of separation, Gorringe et al. (2012) support the efficacy of immersion, where communication teams physically integrate into the crowd structure. This reduces the perception of the police as an opposing block and establishes a relationship based on accessibility and dialogue.

Third, the analysis of **tactical gear** draws upon the „Weapons Effect" theory. Scientific studies (Adang 2011) indicate that the visibility of heavy protective equipment (such as helmets and body armor) signals an expectation of violence, thereby lowering the inhibition threshold of the crowd to engage in aggression. The Vienna Model's preference for demilitarized attire is thus a strategic move to manage the psychological environment of the event.

Fourth, and most critical for this study, is the dimension of **risk management**.

Info-gap theory (Ben-Haim 2006, 2010, 2018) has not yet been applied to the formulation and evaluation of police strategy, though it is highly relevant. While traditional „Warrior" models seek optimization by attempting to drive risk to zero through overwhelming force, this often leads to fragility when intelligence is flawed. In contrast, the robust-satisficing approach developed in info-gap theory recognizes and manages information gaps. In the context of policing, this means choosing a strategy (de-escalation) that remains effective even if the threat landscape is more severe than anticipated, avoiding the catastrophic failure often associated with unjustified repression.

Fifth, the **information flow** within these operations is described in the literature using the philosophical concept of the „rhizome" (Deleuze and Guattari 2007). Unlike hierarchical, top-down surveillance trees, immersive policing creates a horizontal network of information. Officers embedded in the crowd act as empathetic sensors (HUMINT), allowing for a faster and more

nuanced understanding of emotional shifts than external observation allows (Madensen and Knutsson 2011; Stott et al. 2013).

Sixth, regarding **crowd psychology**, the literature utilizes the sociological concept of resonance (Rosa 2019). When police action is perceived as legitimate, it creates a resonant relationship with the crowd, facilitating the phenomenon of intra-group regulation. Empirical studies confirm that under these conditions, the peaceful majority of the crowd actively suppresses disruptive behavior from within (Stott et al. 2008).

Finally, the **response to an aggrieved gathering** (such as fans facing a cancellation) is analyzed through the lens of the reformulated frustration-aggression hypothesis (Berkowitz 1989). Unlike the classical deterministic model (Dollard et al. 1939), this modern approach posits that frustration creates a readiness for aggression (negative affect), but the actual outcome is modulated by situational cues. Therefore, removing aggressive stimuli—such as riot gear—prevents the conversion of frustration into violence. Consequently, traditional dispersal often presents cues that trigger aggression, whereas Waddington (2013) suggests that a strategy of transformation is superior, where the police facilitate a surrogate goal (e.g., allowing a spontaneous gathering in a new location). This re-channels the crowd's energy constructively rather than blocking it.

This theoretical framework confirms that the operational choices made in Vienna were consistent with advanced systems theory. Having established the scientific validity of these parameters, the following section will proceed to rigorously quantify these qualitative dimensions.

3 Robustness Analysis of the Decision

3.1 The Problem

Summarizing the discussion in section 1, we re-iterate two scenarios between which the authorities had to choose. Both scenarios are predicated on intelligence that indicates the real possibility of a violent attack. Our generic analysis is motivated by the historical events connected with the cancellation of the Taylor Swift concerts in August 2024. We use the language of that event in the generic formulation.

The first scenario was to hold the fans in a perimeter around The Stadium. Numerous large public events had been held at The Stadium in the past, almost always with few or no injuries to participants. However, field intelligence indicated the potential presence of a significant insider threat that could lead to extensive injury and damage in the constrained physical environment immediately around The Stadium. This threat is highly uncertain in its extent. The estimated extent of injury, *if* the threat is realized, is denoted, $\tilde{r}(1)$, which is substantial. However, the actual extent of injury in this scenario, denoted $r(1)$, is highly uncertain and may greatly exceed the estimate $\tilde{r}(1)$. Specifically, the estimated injury, $\tilde{r}(1)$, may err by as much as $w(1)$ or more, perhaps much more given the uncertain but threatening intelligence. That is, the intelligence provides two numerical estimates for this scenario, and the contextual understanding that the actual level of injury, if an attack occurs, could exceed the estimate by far more than $w(1)$.

The second scenario that was available to the authorities was to disperse the fans and to adopt a strategy of non-hierarchical embedding of security forces in spontaneous gatherings of the concert participants in Corneliusgasse. This is a large public space in which the police could actively intermingle and interact with the participants. This enabled the police to employ a strategy of cultural immersion, including exchanging friendship bracelets, empathic communication, and generally integrating in the popular event. By „immersing" themselves in the crowd's social system, officers transformed from external observers into internal actors. This would satisfy a deep public desire for spontaneous cultural activity, and would enable real-time monitoring for dangerous or illegal activities.

The potential for injury in this second scenario, *if* the threat is realized, is denoted $\tilde{r}(2)$, and is estimated to exceed the extent of injury at a regular Stadium event because of the wide-ranging opportunities for attack over a large area. The real extent of injury in this scenario, denoted $r(2)$, is uncertain. The estimated injury in this scenario, $\tilde{r}(2)$, may err by as much as $w(2)$ or more. However, because of the active and integrated real-time involvement of police agents, the uncertainty in how this scenario would develop is less than in the constrained Stadium environment. Once again, intelligence provides two numerical estimates, $\tilde{r}(2)$ and $w(2)$, and the contextual understanding that the actual level of injury, $r(2)$, may exceed $\tilde{r}(2)$ by far more than $w(2)$.

In the subsequent numerical example the estimated (but highly uncertain) values for the number of injuries are $\tilde{r}(1) = 60$ for The Stadium and $\tilde{r}(2) = 260$ for Corneliusgasse. The corresponding error estimates are $w(1) = 200$ and $w(2) = 50$. These values derive both from assessment of the threat and from assessment of the extent and capabilities of available law enforcement personnel and equipment.

These values demonstrate the dilemma confronting the authorities in choosing between the two mutually exclusive scenarios. The first scenario (The Stadium) entails a smaller estimated level of injury, $\tilde{r}(1)$, if an attack occurs, than the estimated level of injury for the second scenario (Corneliusgasse), $\tilde{r}(2)$. However, the error estimate for The Stadium, $w(1)$, is much greater than the error estimate for Corneliusgasse, $w(2)$. Thus Corneliusgasse is putatively worse than The Stadium, but The Stadium is far more uncertain and thus possibly much worse than Corneliusgasse.

In section 3.2 we outline the info-gap analysis of robustness to uncertainty of an event that could lead to a significant level of injury. This analysis underlies the selection between two alternative events, scenario 1 (e.g. The Stadium) and scenario 2 (e.g. Corneliusgasse), as developed in a numerical example in section 3.3. This provides a response to the dilemma we have described. Info-gap decision theory is described in detail elsewhere. Ben-Haim (2006) and (2010) provide quantitative discussions and examples of the info-gap methodology, while Ben-Haim (2018) is strictly qualitative. See also applications of info-gap theory in many disciplines on the info-gap website https://info-gap.technion.ac.il.

3.2 Info-Gap Analysis of Robustness to Uncertainty

The analysis begins by defining a performance requirement. In the present example the authorities determine the largest acceptable level of injury. The level of injury is a number, r, and the greatest acceptable level of injury is denoted r_c. A small value of r_c is an ambitious or demanding requirement, while a larger value of r_c is more modest or lenient. The choice of a value of r_c is a difficult subjective ethical judgment that is supported, in part, by assessing the confidence of achieving injury no greater than r_c in light of the deep uncertainties. Confidence in satisfying the performance requirement is assessed with the info-gap robustness function. The info-gap analysis depends on the extent and capability of available law enforcement personnel and equipment, as mentioned earlier.

For any specific event, such as the concert at The Stadium or the distributed public activity in Corneliusgasse, the anticipated level of injury is $\tilde{r}$, which may be an acceptable level of injury. The actual level of injury, r, may be substantially greater due to deep uncertainties surrounding the event. That is, the value $\tilde{r}$ is very likely wrong and may err by w or more, possibly much more, because the future circumstances that will arise are highly uncertain.

Public events with thousands of participants are accompanied by numerous, diverse and highly uncertain risks (Interview, 16.12.2025). These risks include potential violence between participants with different social or political orientation, drunkenness, theft, placement of explosive devices by terrorists, explosive drones or remotely operated rockets, inadequate police presence due to logistical issues or different events elsewhere, malfunctioning of gas cylinders used by vendors, and so on. Further uncertainties arise in how participants get to and from the event by car, bus or train, and how this dense confluence of people is safely managed. Access of adequate medical teams in the case of an emergency is also problematic when thousands of participants are present. Events occurring in open urban spaces such as streets or parks entail additional uncertain risks including rifle sniping from concealed locations, deliberate injury by vehicles, and attack by pre-organized non-participants.

Let r_c denote a level of injury that is nonetheless greater than $\tilde{r}$. We ask: How much can the event evolve differently from the initial assessment, and the actual level of injury would not exceed r_c? If large uncertainty can be tolerated, say 3 or 4 times the error estimate w, then contextual understanding may suggest that we have reasonable confidence that the level of injury of the event would not exceed r_c. On the other hand, if a small error in the estimate could result in injury exceeding r_c, then the event cannot be reliably approved.

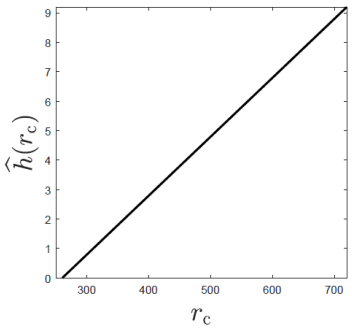


Figure 1: Robustness curve for Corneliusgasse.

We now introduce the robustness function. Consider a performance requirement that specifies the acceptable level of injury r_c, which is a parameter. The robustness to uncertainty is the greatest error in the estimate, $\tilde{r}$, at which the resulting level of injury cannot exceed r_c. In other words, the robustness is the greatest uncertainty that can be tolerated and not exceed the performance requirement r_c. We denote the robustness function $\hat{h}(r_c)$. As r_c becomes smaller (more demanding, allowing less injury) the robustness to uncertainty becomes lower (worse): more demanding requirements are less robust to uncertainty. This is seen in the robustness curve in fig. 1, calculated with the robustness function in eq.(8) of the appendix, which is for the parameters of the Corneliusgasse scenario. The positive slope expresses the trade off between immunity to uncertainty and the quality of the outcome: more demanding outcome (smaller r_c, lower level of injury) is less immune to uncertainty in the assessment (has lower robustness $\hat{h}(r_c)$). The robustness function is derived analytically in the appendix in section 5.

This trade off is sometimes called The Pessimist's Theorem: a more demanding outcome is less robust to uncertainty. Pessimists are not surprised. The point is that we can quantitatively evaluate this trade off, thereby supporting the choice between the alternative events, and we can evaluate the confidence in a required outcome r_c given existing police resources. Note that the info-gap robustness function assesses the impact of deep uncertainty without requiring any probabilistic information. In fact, our entire information is exceedingly limited.

We summarize our discussion of the robustness function by examining the robustness curve. This curve shows two important properties: zeroing and trade off.

The predicted level of injury is $\tilde{r} = 260$ for the Corneliusgasse scenario, whose robustness to uncertainty for this prediction is zero. This is the *zeroing property:* a predicted outcome has no robustness to uncertainty in the knowledge upon which the prediction is based. Predicted outcomes are thus not a reliable basis for assessing the effectiveness of available police resources in any specified scenario.

The robustness improves (increases) as the required level of injury worsens (gets larger). This is the *trade off property:* less demanding requirements (larger r_c) are more robust to uncertainty (larger $\hat{h}$). Numerical evaluation of the robustness function supports both the quantitative evaluate of this trade off, and the identification of levels of injury that can be confidently anticipated.

3.3 Preference Reversal Based on Robustness

We now consider two different events or scenarios, denoted 1 and 2, between which the authorities had to choose. In the subsequent numerical example, scenario 1 is that the crowd is contained in the perimeter of The Stadium, while scenario 2 is that the crowd is dispersed in Corneliusgasse. The predicted levels of injury from these two scenarios are $\tilde{r}(1)$ and $\tilde{r}(2)$, respectively.

Specifically, the predicted level of injury is smaller with scenario 1 than with scenario 2:

$$\tilde{r}(1) < \tilde{r}(2) \tag{1}$$

However, scenario 1 has many unfamiliar alternative possible paths of development. Thus the uncertainty estimate is greater for scenario 1 than for scenario 2:

$$w(1) > w(2) \tag{2}$$

Scenario 1 is predicted to be better than scenario 2, as stated in eq.(1). However, the prediction for scenario 1 is more uncertain than the prediction for scenario 2, as stated in eq.(2). The police planner faces the dilemma discussed in section 3.1: should one adopt the putatively better but more uncertain scenario, 1, or the putatively worse but less uncertain scenario, 2? We present a quantification of this dilemma, and a resolution (if there is one), based on the robustness functions for these two scenarios, shown in fig. 2 for The Stadium, scenario 1, and the Corneliusgasse, scenario 2, both of which are calculated with eq.(8) of the appendix.

Scenario 1 is predicted to be better than scenario 2 because 1 is predicted to have a smaller level of injury. This is stated in eq.(1), and manifested in fig. 2 by the horizontal intercept of the dashed robustness curve for scenario 1, The Stadium, being to the left of the horizontal intercept of the solid robustness curve for scenario 2, Corneliusgasse.

The uncertainty estimate for scenario 1 is greater (worse) than for scenario 2 as stated in eq.(2). Consequently the robustness curve for scenario 1 is less steep than the robustness curve for scenario 2: a given increase (improvement) in robustness requires a greater increase (worsening) in the performance requirement r_c for scenario 1 than for scenario 2.

The intersection between the robustness curves results from eqs.(1) and (2). Let $r_\times$ denote the value of r_c at which the robustness curves cross one another.

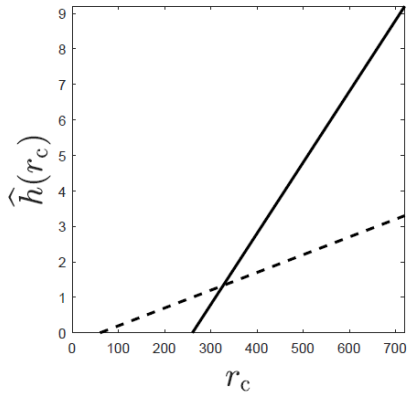


Figure 2: Robustness curves for The Stadium (dash) and Corneliusgasse (solid).

Scenario 1 (The Stadium) is more robust (and hence robust-preferred) for r_c less than $r_\times$, while scenario 2 (Corneliusgasse) is more robust for r_c greater than $r_\times$. Neither option is robust-dominant, which manifests the dilemma in choosing between these scenarios. The resolution — if there is one — is to choose the scenario that is more robust at an adequate value of r_c, *provided* that the robustness is adequately large. How much robustness is enough is a delicate issue that we won't address here (see Ben-Haim 2006, chap. 4). It is sufficient to say that a robustness of several units of the uncertainty weight is probably sufficient.

The intersection between the robustness curves occurs at $r_\times = 327$ injuries and at the corresponding robustness $\hat{h}_\times = 1.3$. This value of robustness means that the level of injury will not exceed 327 provided that the estimates, $\tilde{r}(1)$ and $\tilde{r}(2)$, do not err more than 1.3 times their respective error estimates, $w(1)$ and $w(2)$. Our information and contextual understanding is that the estimates may err by the corresponding error estimate or more, possibly much more. Hence robustness of 1.3 represents low immunity to uncertainty in the estimates. One can have little confidence that the level of injury would not exceed 327 in either scenario.

In summary, we stress four points when choosing between two highly uncertain alternative scenarios such as The Stadium or Corneliusgasse.

First, the predicted outcomes (levels of injury) are not a reliable basis for choosing between the scenarios. This is because the robustness to uncertainty of these predictions is precisely zero. In the specific choice between The Stadium and Corneliusgasse, the predicted outcomes are $\tilde{r}(1) = 60$ and $\tilde{r}(2) = 260$ for The Stadium and Corneliusgasse, respectively. The Stadium is predicted to be much better than Corneliusgasse, but these predictions have no robustness to uncertainty in

the information upon which they are based, and thus are not a reliable or responsible basis for selecting between these scenarios.

Second, the robustness to uncertainty trades off against the required performance: a more demanding performance outcome (lower level of injury) has lower robustness against uncertainty; a less demanding outcome has greater robustness. This means that the choice between the alternatives must balance between robustness to uncertainty and quality of the outcome. This trade off is manifested in the positive slopes of the robustness curves.

Third, robustness curves for alternative scenarios may cross one another, implying that neither option is robust-dominant. This occurs in the present example of choosing between The Stadium and Corneliusgasse, and expresses a dilemma confronting the decision maker. While The Stadium is predicted to be better than Corneliusgasse, the latter scenario is more robust to uncertainty at larger (worse) outcomes. The preferred option depends on the demanded outcome if the corresponding robustness is adequate.

Fourth, large robustness is required. For example, a robustness of 3 may be considered barely adequate. The levels of injury, r_c, for robustness of $\hat{h} = 3$ in The Stadium and the Corneliusgasse scenarios, are 660 and 410 respectively. Rather than concluding that neither option is acceptable, this divergence highlights the decisive superiority of the Corneliusgasse scenario. Through the strategy of rhizomatic immersion and the resulting preservation of police agency, the potential level of injury under extreme uncertainty is effectively capped at 410. In contrast, the rigid containment approach at The Stadium allows potential injuries to escalate to 660. Consequently, for a decision maker demanding a robustness of $h = 3$, the Corneliusgasse scenario represents the robust-preferred strategic choice, demonstrating how social embedding actively mitigates catastrophic risk. Requiring greater robustness would entail even larger levels of injury. Information can be improved by gathering further intelligence that could alter the estimated levels of injury and the error estimates. This intelligence may reduce the error estimates and thus augment the values of robustness. One must recognize, however, that better information may imply larger (worse) estimated levels of injury, which would reduce the values of robustness.

4 Concluding Discussion

The cancellation of the Taylor Swift „Eras Tour“ concerts in Vienna in August 2024 is the prototype of a generic decision dilemma. The security authorities confront a decision-making environment defined by deep uncertainty for which probabilistic information was entirely lacking. Given very limited information, the authorities must choose between an option that is predicted to have a better outcome but is more uncertain, and an option that is predicted to have a worse outcome but is less uncertain.

As this study has demonstrated, the operational dilemma was not a standard optimization problem, but a conflict between the required quality of an outcome and its immunity to a catastrophic failure. By synthesizing the quantitative framework of info-gap decision theory with the qualitative doctrine of the Vienna State Police („3-D Strategy“), we can articulate why the spontaneous gathering in Corneliusgasse, initially perceived as a potential soft target, ultimately emerged as the robust-preferred scenario.

The numerical analysis in section 3 highlights a critical preference reversal. Conventional risk assessment would have favored the first scenario, The Stadium, due to its significantly lower predicted level of injury ($\tilde{r}(1) < \tilde{r}(2)$) afforded by fixed physical perimeters. However, this scenario suffered from a massive estimated error ($w(1)$). The intelligence regarding a concrete Islamist terror plot involving insider threats and chemical explosives meant that the plausible potential for far greater injury was very large. In info-gap terms, the robustness curve for The Stadium was dangerously flat, demonstrating a very strong trade off between the quality of the outcome and the robustness to uncertainty: the robustness of acceptable outcomes was very low for this scenario.

In contrast, the second scenario, Corneliusgasse, began with a higher putative estimate of injury, $\tilde{r}(2)$, due to the uncontrolled nature of the urban space. Yet, it proved to be the superior strategic choice because it enabled active immersion of security personnel, thus entailing a lower uncertainty estimate ($w(2)$). This was achieved through the specific operational strategy of „rhizomatic immersion.“ Abandoning the traditional „Warrior” mindset, the police acted as „Guardians,” physically integrating into the crowd’s social system. The reciprocal exchange of friendship bracelets between uniformed officers and fans was not merely a performative gesture; it functioned as a tactical mechanism to dissolve the barrier between state authority and the social

rhizome. This immersion generated a continuous flow of high-fidelity human intelligence (HUMINT) and established an emotional resonance that drastically lowered the potential for aggression.

Mathematically, this reduction of social uncertainty ($w(2)$) resulted in a steepening of the robustness curve for the Corneliusgasse scenario. This steepness indicates that a small concession in the strictness of the outcome (accepting minor increase in level of injury) yielded a massive gain in immunity against the uncertain attributes of the potential terroristic attack. Consequently, for any realistic performance requirement r_c that acknowledges the impossibility of zero injury if an attack occurs, Corneliusgasse became the robust-preferred strategy.

While this study demonstrates the strategic superiority of rhizomatic immersion under deep uncertainty, several limitations must be carefully acknowledged. First, the numerical parameters assigned to the anticipated levels of injury (r_1, r_2) and their respective error estimates (w_1, w_2) are not derived from historical epidemiological casualty datasets. Rather, they serve as heuristic proxies utilized to formally quantify a qualitative decision dilemma. These values illustrate the structural mechanics of info-gap decision theory and the relative robustness of tactical choices, rather than providing exact predictive metrics. Second, the open-source intelligence (OSINT) used to reconstruct the spatial and social dynamics of the Corneliusgasse gathering is inherently subject to the fragmentary nature of digital documentation. Consequently, the findings formalize a systemic mechanism of resilience and risk mitigation—demonstrating how police agency and social embedding reduce vulnerability—but do not claim deterministic predictive power for all future urban security contexts. Future research should aim to test this formalization against broader empirical case studies of adaptive policing.

The long-term efficacy of this decision was cemented by the „Swienna Revival“ in August 2025. The institutionalization of the gathering and the installation of the commemorative plaque inscribed with „Hate has no place here“ stand as empirical evidence of the strategy’s success. Ultimately, the Vienna case illustrates that affective governance is a quantifiable security asset. By choosing to „Walk Cornelia Street Again“ (Swift 2019) alongside the fans rather than blocking them, the authorities successfully navigated the dilemma. This demonstrates that the most robust defense against unknown threats is the co-creation of security with the community.

The legacy of the event is thus defined not by the terror that was planned, but by the successful strategic choice to „grieve concerts and not lives“ (Swift 2024).

5 Appendix: Derivation of the Info-Gap Robustness Function

In this section we derive an explicit algebraic expression for the robustness function for the example in section 3. This section is relevant to those who are interested in the mathematical details of info-gap decision theory as applied to the decision of this example.

For any choice of event, denoted by the index q, the estimated level of injury is $\tilde{r}(q)$. However, the actual level of injury, $r(q)$, is highly uncertain. That is, $\tilde{r}(q)$ is undoubtedly wrong, and may err by as much as the error estimate $w(q)$ or more. We have no probabilistic information about the uncertainty in the level of injury, nor do we know a worst case. Our quantitative knowledge about the event q is limited to two numbers: $\tilde{r}(q)$ and $w(q)$.

An info-gap model for unbounded non-probabilistic uncertainty, given the knowledge we have, is the following fractional-error model:

$$\mathcal{U}(h,q) = \left\{r(q):\ r(q) \geq 0,\ \left|\frac{r(q)-\tilde{r}(q)}{w(q)}\right| \leq h\right\},\quad h \geq 0 \tag{3}$$

At any value of h, the set $\mathcal{U}\$(h,q)$ contains all levels of injury, $r(q)$ for event q, whose fractional errors relative to the error estimate $w(q)$, do not exceed the value h. We call h the horizon of uncertainty, and it is unbounded. Hence this info-gap model is an unbounded family of nested sets of possible levels of injury. This info-gap model quantifies great uncertainty without any probabilistic information and without specifying a worst case.

Our performance requirement is that the level of injury not exceed the critical value, $r_{\rm c}$:

$$r(q) \leq r_{\rm c} \tag{4}$$

The problem we face is that the value of $r(q)$ is highly uncertain.

The robustness of event q is the greatest horizon of uncertainty, h, up to which the level of injury resulting from this event, $r(q)$, does not exceed the critical value \$r_{\rm c}\$. The formal definition of the robustness function is:

$$\hat{h}(r_c, q) = \max\left\{h:\ \left(\max_{r \in \mathcal{U}(h,q)} r(q)\right) \le r_c\right\} \tag{5}$$

Let $m(h)$ denote the inner maximum in the definition of the robustness in eq.(5). This maximum occurs when $r(q)$ is maximal at horizon of uncertainty h. Using the info-gap model of eq.(3), one obtains an explicit expression for $m(h)$:

$$m(h) = \tilde{r}(q) + w(q)h \tag{6}$$

The robustness is the greatest value of h such that $m(h)$ does not exceed r_c:

$$m(h) = \tilde{r}(q) + w(q)h \le r_c \tag{7}$$

Solving for h at equality yields the robustness function:

$$\boxed{\hat{h}(r_c, q) = \frac{r_c - \tilde{r}(q)}{w(q)}} \tag{8}$$

or zero if this is negative. This robustness function shows the zeroing and trade off properties discussed earlier.

6 References

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7 Data Availability

All data generated or analyzed during this study are included in this manuscript and its supplementary files. The open-source intelligence (OSINT) materials used for the qualitative reconstruction of the events and the formulation of the model's parameters consist of publicly accessible media and social network reports, which are systematically referenced in the bibliography. Importantly, the numerical estimates utilized in the info-gap model are grounded in comprehensive factual research rather than abstract assumption. These heuristic estimates synthesize empirical data points, including official ticket sales, stadium capacity, historical precedents of ticketless Taylor Swift fan gatherings outside venues, the deployment of broadcast screens, geographic and traffic infrastructure surrounding the Ernst-Happel-Stadion, the spatial capacity of Corneliusgasse, available law enforcement personnel, intelligence reports, hotel booking statistics, and international fan travel movements. The complete mathematical derivation of the info-gap robustness function is explicitly detailed in the Appendix (Section 5) to allow full

methodological scrutiny. Furthermore, the computational script utilized to generate the robustness curves (Figure 1 and Figure 2) has been provided as a Supplementary File for the purposes of peer review.