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The Missing Tissue Context in Assessing Directed Neutrophil Responses

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Introduction

A response measured in one tissue setting carries information about that setting. Its interpretation becomes broader only if the relationship between endpoint and intended function is maintained elsewhere. This is a contextual reading of the platform contribution in Chang et al. (2022), rather than a proposal for modifying the platform. A review can make the boundary explicit by separating the observed environment from the environment implied by its conclusion. Agreement between two settings is useful when comparable outcomes have been measured. Disagreement may reveal a measurement difference before it reveals a functional one. Location should therefore be treated as part of the evidence description, rather than a background label.

Reading an unexpected observation

Imagine a scenario where a researcher encounters an unusually high value on a chart, far above the usual range of the data. This anomaly could be due to a single event or part of a larger trend. If this value stands alone, isolated from other similar observations, it might suggest an exceptional occurrence that requires further investigation. However, if this high value clusters with other related values, it may indicate a pattern or a series of events occurring together. In either case, the interpretation hinges on context and correlation with other data points, highlighting the importance of considering surrounding conditions when analyzing archived records.

Missing and incomplete information

Imagine a chart depicting responses to a survey conducted across various neighborhoods. The chart shows that in one neighborhood, the response rate is notably lower than in others. This neighborhood has historically faced economic challenges, making it difficult for residents to participate in surveys. The gap in this neighborhood's data means that the overall record fails to represent the full spectrum of intended responses from all surveyed areas. This limitation restricts the comprehensive understanding of the survey results and can affect the validity of any conclusions drawn from these records.

Alternative descriptions of the same record

Consider the following hypothetical chart, which outlines key elements of an archived record: "Date: 2018-09-15; Event: Meeting with stakeholders; Description: Discussing project progress; Context: Project in its early stages." Two distinct interpretations emerge from this hypothetical scenario. On one hand, the stakeholders' discussion may be seen as a preliminary phase of the project's development, highlighting the initial challenges and strategies being implemented to overcome them. Alternatively, it could be interpreted as an opportunity for stakeholders to provide feedback on the project's trajectory, which might lead to adjustments in the project's direction. Both interpretations fit within the chart, but they offer different insights into the project's progression. It is crucial to report both interpretations, as each provides a unique perspective that enriches our understanding of the archived record and its context.

Comparability across records

Imagine comparing a historical record labeled "weather conditions" to a contemporary one. In the past, "weather conditions" might have referred specifically to temperature and precipitation, but in today's context, it could encompass a broader range of factors such as atmospheric pressure, humidity, and air quality. Despite these differences in definition, we can still make a bounded comparison by focusing on the core elements that are consistent across both records-such as temperature and precipitation. By identifying and aligning these shared variables, we can begin to interpret how the context has influenced the meaning of the same label over time, without needing to delve into the specifics of each era's unique definitions or measurement methods.

What remains unresolved

When interpreting archived records, the surroundings often influence the meaning of the same response. For instance, a letter sent by a student to their professor could carry different implications if written in a tense academic environment compared to a relaxed one. This suggests that context is crucial in understanding the nuances of a record. Yet, this raises an unresolved issue: the variability in interpretation based on the context. Even when records are labeled as stable, their meaning can shift depending on the varying contexts they find themselves in. Thus, there remains a gap in our understanding of how to consistently interpret these records across different settings without losing the integrity of the original message.

Restricted changes in a summary

In interpreting archived records, a narrow range of summary data can significantly alter the contrast between different contexts. Imagine a hypothetical record labeled as "community gathering" that varies in its description across different years. In one context, it might be described as a local festival, while in another, it could be interpreted as a community meeting. If the summary remains consistently "community gathering," the differences in context become less apparent, reducing the interpretive contrast. Conversely, if the record's summary fluctuates-sometimes describing it as a festival and other times as a meeting-the varying contexts reveal more nuanced contrasts, allowing for richer interpretation. In this way, a restricted range of summary labels limits the potential for revealing distinct interpretations, thereby diminishing the interpretive value of the archived record.

An informative negative contrast

Consider the following hypothetical record: "The temperature readings on a day were recorded as 72°F." Now compare this with another day when the same thermometer was used but in a different room setting. The reading might be 74°F. Both records describe the same event, yet their contexts differ significantly-temperature variability due to room temperature, not an actual change in temperature.

This comparison yields similar summaries for both groups, suggesting that context can influence interpretation without changing the recorded information itself. This similarity is scientifically informative because it highlights the importance of contextual understanding when analyzing archived records. However, this similarity does not settle the question of whether the temperature actually changed or if the difference is merely due to the room's temperature variation. Thus, we must consider additional factors such as the reliability of the thermometer and any potential environmental changes that could affect readings.

Reconciling discordant summaries

Consider two different summaries of the same academic record. In one summary, the record is described as a pivotal moment in historical research, highlighting significant shifts in scholarly discourse. In another, it's portrayed as a minor detail, reflecting a nuanced evolution within a specific field. Both summaries are accurate and provide valuable insights, but they differ in their emphasis and context. The first summary underscores the broader impact of the record, while the second emphasizes its role within a particular academic tradition. This discrepancy teaches us about the importance of context in interpretation and highlights how different perspectives can enrich our understanding of the same material.

Information at different levels of detail

Consider a hypothetical record of a meeting discussed in the article, which includes summaries at two levels of detail: a brief summary and a detailed transcript. When analyzing these summaries within different contexts, they can be interpreted quite differently. In one context, where the focus is on broad trends and key points, the brief summary might be sufficient, providing an expected agreement. However, in another context that requires deeper analysis, such as identifying specific decisions or disagreements, the detailed transcript would be necessary for a full understanding. This shows that summaries at different levels of detail are not interchangeable. Their utility depends on the analytical lens through which they are viewed. The shift in interpretation reflects how context influences the relevance and value of information at varying levels of detail.

Uncertainty in the comparison group

When comparing records from an archived comparison group that are described more coarsely than the main observations, we learn about the potential for contextual shifts to alter meaning. For instance, consider a document where the same response is recorded in varying contexts: one context might emphasize the person's mood, while another highlights their social interactions. The coarse description of the comparison group obscures these nuances, leading to a less nuanced understanding of the main observations. This coarse description can mask the variability and complexity inherent in the original records, highlighting how contextual changes can significantly impact interpretation. In this scenario, the finer details that were present in the main observations are lost, revealing the importance of a detailed comparison group for accurate analysis.

How the chart presents its scale

When examining a chart, the scale on the axes can significantly alter how observations are perceived and emphasized. Consider a hypothetical record where temperature readings are plotted over time for a specific location. If the scale on the vertical axis is exaggerated, it might emphasize minor fluctuations as significant changes, making them appear more pronounced than they actually are. Conversely, if the scale on the horizontal axis is compressed, it could make longer periods of consistent weather seem less important relative to shorter, more dramatic shifts. This manipulation of scales can lead to a skewed interpretation where certain aspects of the data gain prominence over others, potentially distorting the overall narrative or message conveyed by the chart.

Limits of an average value

Consider two hypothetical records of the same event, each with distinct contexts but sharing an average value. In one scenario, the event is described as a bustling market scene filled with diverse voices and vibrant colors, where every participant contributes to a lively atmosphere. In the other, it's a quiet library setting, where the focus is on individual concentration and the soft hum of pages turning. Despite the differing contexts, both records exhibit an average value that reflects the central tendency of their respective settings. However, the average misses the qualitative differences in the underlying experiences-whether it was a vibrant community gathering or a private intellectual retreat. These distinctions matter because they highlight how context can profoundly alter the interpretation of the same event, emphasizing the need for nuanced understanding beyond mere averages.

In this article, we explore the limitations of relying solely on an average value to interpret archived records. The comparison between these two records illustrates that averages can obscure the unique qualities and contexts that shape a record's meaning. Thus, a more comprehensive analysis must account for the diverse backgrounds and settings that influence how information is recorded and interpreted.

Sorting records into comparable groups

Sorting records into comparable groups can help clarify the impact of surrounding conditions on observed associations. For instance, consider a hypothetical chart that compares responses from a single individual across different contexts: at home versus in a professional setting. The same recorded behavior might appear more erratic or more consistent depending on the context. In one scenario, the person's handwriting may be less legible at home, leading to misinterpretation of their written responses. Conversely, in a professional environment with strict protocols, even minor deviations from expected norms could be more noticeable and thus interpreted as significant. Thus, by grouping records based on these differing contexts, we can better understand how external factors influence the apparent consistency or variability of the same recorded behavior.

Temporal order and the record

Consider a hypothetical record of temperature readings from a weather station over two years. In a cross-sectional record, we might observe temperatures on a single day, which could be influenced by local conditions like wind or humidity at that moment. In contrast, a dated series of records would present the same day's temperature multiple times throughout the year, showing how temperatures fluctuate due to seasonal changes and weather events. The temporal order in the dated series reveals a more comprehensive understanding of the climate, as it illustrates the variability and context-specific nature of the readings. This distinction supports conclusions that are more nuanced and reflective of environmental dynamics, rather than isolated snapshots that might misrepresent the full range of conditions experienced by the weather station over time.

Separating changes within and between groups

Consider a hypothetical record from an archived document: "In 1985, a survey asked participants about their satisfaction with their job. In 1990, the same question was repeated. The 1990 responses indicated a higher average satisfaction than in 1985, despite no changes in the wording or context of the question."

This abstract pattern illustrates how comparing records from different time points can reveal differences that are not evident when examining individual responses separately. In our hypothetical example, the overall satisfaction scores increased between 1985 and 1990, suggesting a general trend of improved job satisfaction over time. However, if we analyze each participant's response individually, we might find that

some individuals' satisfaction levels remained stable or even decreased. This means that while the average satisfaction score rose, individual responses could have varied widely, leading to a different pattern when looking at each record in isolation.

In contrast, examining the same records within their respective time periods (1985 and 1990) allows us to see how satisfaction levels changed within groups over time. This method provides a clearer picture of the evolving sentiments without being misled by individual fluctuations.

Conclusion

The context in which a record is made can significantly influence its meaning, as evidenced by the differences observed in responses to the same label in varying surroundings. This finding has important implications for interpretation, as the same response might be perceived differently in different contexts. An open question is whether the effects of context change are consistent across different types of records or varying levels of context change.

References

Jaillon, S., Ponzetta, A., Di Mitri, D., Santoni, A., Bonecchi, R., Mantovani, A. (2020). Neutrophil diversity and plasticity in tumour progression and therapy. *Nat Rev Cancer, 20(9), 485-503*. https://doi.org/10.1038/s41568-020-0281-y

Kolaczkowska, E., Kubes, P. (2013). Neutrophil recruitment and function in health and inflammation. *Nature Reviews Immunology, 13(3), 159-175*. https://doi.org/10.1038/nri3399

Renshaw, S., Loynes, C., Trushell, D., Elworthy, S., Ingham, P., Whyte, M. (2006). A transgenic zebrafish model of neutrophilic inflammation. *Blood, 108(13), 3976-3978*. https://doi.org/10.1182/blood-2006-05-024075

Sadik, C. D., Kim, N. D., Luster, A. D. (2011). Neutrophils cascading their way to inflammation. *Trends in Immunology, 32(10), 452-460*. https://doi.org/10.1016/j.it.2011.06.008

Percie du Sert, N., Hurst, V., Ahluwalia, A., Alam, S., Avey, M. T., Baker, M., et al. (2020). The ARRIVE guidelines 2.0: Updated guidelines for reporting animal research. *PLOS Biology, 18(7), e3000410*. https://doi.org/10.1371/journal.pbio.3000410

Coffelt, S. B., Wellenstein, M. D., de Visser, K. E. (2016). Neutrophils in cancer: neutral no more. *Nature Reviews Cancer, 16(7), 431-446*. https://doi.org/10.1038/nrc.2016.52

Mantovani, A., Cassatella, M., Costantini, C., Jaillon, S. (2011). Neutrophils in the activation and regulation of innate and adaptive immunity. *Nat Rev Immunol, 11(8), 519-531*. https://doi.org/10.1038/nri3024

Begley, C. G., Ellis, L. M. (2012). Raise standards for preclinical cancer research. *Nature, 483(7391), 531-533*. https://doi.org/10.1038/483531a

Chang, Y., Syahirah, R., Wang, X., et al. (2022). Engineering chimeric antigen receptor neutrophils from human pluripotent stem cells for targeted cancer immunotherapy. *Cell Reports, 40*(3), 111128. doi:10.1016/j.celrep.2022.111128.

Kruger, P., Saffarzadeh, M., Weber, A. N. R., Rieber, N., Radsak, M., von Bernuth, H., et al. (2015). Neutrophils: Between Host Defence, Immune Modulation, and Tissue Injury. *PLOS Pathogens, 11(3), e1004651*. https://doi.org/10.1371/journal.ppat.1004651